RAILROAD GAZETTE

FRIDAY, FEBRUARY 4, 1898.

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Contributions.

Additions to English Railroads.

LONDON, Jan. 17.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If you were to record—even very briefly—all the new steam railway schemes which are now planned and are only awaiting parliamentary sanction, you would have to set apart a good many pages for the purpose. I mention a few of the more important works to be taken in hand:

North Staffordshire & Mid-Derbyshire (new potteries scheme).—To provide a new route connecting the potteries with the Derbyshire coalfields. Estimated cost nearly $4,000,000.

Midland Railway.—To construct 30 miles of new line in Yorkshire; also 21 miles of widenings on portions from Leeds to Skipton and Bradford, and from Derby and Sheffield to Leeds; also from Chesterfield to Sheffield, Birmingham to Derby, Syston to Peterborough, and at East Wigston in Leicestershire. The Sheffield station is to be enlarged. The company will have to raise something like $28,000,000 new capital.

Great North of Scotland.—The widening of various lines and stations; new capital to be raised, about $2,000,000.

London & North Western.—Propose to introduce a service of steam vessels between Hollyhead and the Lough of Carlingford.

London, Brighton & South Coast.—Widenings of various lines, construction of 15½ miles of new railways. Further capital will be wanted to the tune of six or seven million dollars.

South Eastern Railway.—To construct eight miles of new lines, etc. Capital required between three and four million dollars.

Hull & Barnsley.—To construct several important, but short, lines for the purpose of establishing connections between other lines.

East & West Wales Railway.—To construct an entirely new line 50 miles long, Llanilar in Cardiganshire, to New Radnor. Capital about three to four million dollars. These are only a few of the more important undertakings.

B.

To Reverse or Not?

New York, Ontario & Western Railway Co.
MIDDLETOWN, N. Y., Feb. 1, 1898.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Answering your letter of Jan. 28 relative to our practice and my personal views on the matter of "To Reverse or Not?"

The test that the Westinghouse Air Brake Co. made on the Philadelphia Division of the Pennsylvania Railroad, April 10, 1894, with two passenger trains of equal weight and length, one train fitted with their high-speed brake (then not developed as it is now) and the other with their regular quick-action brake, proved that at 44 miles per hour the train braked so as to allow the wheels to revolve until train stopped, ran 712 ft. from the time brake was applied, and consumed 27 seconds. The high-speed brake which slid the wheels on the other train ran 890 ft. and took 30 seconds to stop.

At 57½ miles per hour the wheels that did not slide ran 1,593 ft. and stopped in 33 seconds, the train with brakes that slid the wheels ran 1,636 ft. and took 34 seconds to stop. These trains ran side by side for two or three miles in order that both trains might be running at the exact speed, and the brakes were applied by the same movement of the lever.

I was present at the test: there were several trials, all of which proved that the best results were obtained by not sliding the wheels.

In 1890, when I first came to this company, none of our freight engines were equipped with air brakes; we began applying them and found it was necessary to issue orders not to reverse the lever when air was applied. Whenever it was done we were obliged to remove the drivers to turn the tires on account of being slid flat. We do not have one case a year now when we formerly had four or five per month, where engineers reversed the lever when applying air.

To further prove that it is better not to reverse, we frequently have cases where brakes are applied until the tire is expanded sufficiently to work them off the wheel centers from ¼ to ½ in., which proves that if the brakes are properly looked after they will give all braking force possible.

If I stood on the rear platform of a passenger coach and saw a train approaching from the rear I would take the chances of my life, with the lever in forward motion and air brake applied rather than have the lever reversed, and air brakes applied at the same time.

GEO. W. WEST,
Superintendent of Motive Power.

Exact Stresses in Drawbridges.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The usual method of determining the stresses in a drawbridge of the swing type is to apply the principle of three moments and thereby find the reactions. This method is not correct, as the theorem of three moments is deduced upon the assumptions of constant moment of inertia of cross-section. This is, of course, not obtained in a truss where the sections of the members vary and where the upper chord is often inclined. The common method gives results very nearly correct for ordinary spans, but for very large ones it is interesting both from a scientific and practical point of view to calculate the stresses exactly.

The advocates of the principle of least work are applying this new law to determine the true stresses in a swing bridge. These may also be found by a simple method of deflection. The following is a brief description of this latter way. While this is not new and is well known by many engineers, it will probably be of interest to some readers.

The reactions are, of course, the first quantities to be determined, and once having found them exactly the calculation of the stresses in all members is the same as in any other truss. To determine the exact reactions the approximate stresses and corresponding sections of all members are determined by the usual method. The bridge is then considered as being opened, or supported only at the center, with the maximum live load upon it. The deflections at the ends are then calculated, which can be readily done by the well-known methods. The live load is then removed and any convenient reactions assumed acting upward at the ends. The deflections produced by the assumed reactions are then calculated. The true end reactions may then be found from the proportion. True reaction is to assumed reaction as deflection due to actual loading is to deflection due to assumed reaction.

The reactions now being determined more accurately, a new calculation of stresses is made. These will usually be found to be so nearly the same as those found by the approximate method that the composition of few members will have to be changed.

It is seen that the deflections were calculated for the truss as first designed, and if any changes are made in the members the deflections will not be exactly correct, and the quantity referred to above as the "true reaction" is only a very close approximation of the true reaction. The deflections may, of course, be recalculated for the new truss, and the exact reactions and stresses obtained, but in practice it will be found that this is an unnecessary refinement.

The determination of stresses as described in the foregoing was used by Mr. Robert Escobar in Mr. Boller's New London drawbridge. This bridge has a span of 497 ft. 10⅓ in., being nearly 113 ft. longer than the Harlem draw of the N. Y. C. & H. R. R. and the N. Y., N. H. & H. R. R.; the latter, however, carries four tracks and the former only two. The New London draw is exceeded in length only by that at Arthur Kill, also by Mr. Boller.

While the above method requires more work than the usual one, it is so simple in its application that it cannot fail to recommend itself to designers requiring great accuracy. That it was adopted by Mr. Escobar is sufficient proof of its merit.

C. F. M.

Continental Railroad Speeds and Accommodation

BY J. PEARSON PATTINSON.

II.—ITALIAN AND SPANISH RAILROADS.

(*a*) *Italy.*—The railroad system of Italy is, with the exception of a few small lines of minor importance, divided into the two networks known as the Rete Mediterranea and the Rete Adriatica. The former, speaking generally, serves the western portion of the country, the latter the eastern, and each system competes with the other at most of the larger centers of population. The general methods of working, the locomotive and carriage stock and even the topographical features of the two systems are so much alike that it will only be necessary to discuss one of them here in order to give an idea of Italian practice, and we have therefore taken the more important of the two, the Rete Mediterranea, for detailed description.

The main lines of the Mediterranean system are those from Milan to Genoa via Voghera and Novi; from Modane through the Mont Cenis tunnel to Turin (most of this being single line, but, in spite of this, forming the principal artery of communication with Central and Northern France); from Ventimille to Genoa (also a single line, although giving connections with the Riviera line of the P. L. M. of France); from Turin to Milan, via Chivasso, Santhia and Novara; from Turin to Parma by by way of Asti, Alessandria, Tortona and Piacenza; from Genoa along the coast via Spezia and Pisa to Rome (this most important route being, curiously enough, single-track except from Chiavari to Pisa); from Pisa to Florence, from Rome to Naples, from Naples to Brindisi and from Naples to Reggio (again single track only). The lines noted above are, with the exceptions stated, all double-track, but all the rest of this considerable system is single-track only. The various branches cover Lombardy and Piedmont.

The most striking feature of these lines is the prevalence of tunnels and of severe gradients. Many of the main and branch routes cross the Apennines at a considerable elevation above sea-level, and few sections of the system are at all level in character. From Milan to Asti; from Milan to Turin; from Genoa to Rome; from Luino through Alessandria to Parma, and along the coast route from Vintimille to Genoa, are the only sections where gradients form no hindrance to speed. Elsewhere long stretches of 40 and 50 ft. to the mile are quite usual, and on many routes the profile presents severe ascents at from 100 to 180 ft. to the mile. Grades of such remarkable character as these merit some detailed description, and accordingly we have arranged in the subjoined table some data relative to gradients of exceptional steepness on the more important of the company's lines, giving at the same time some particulars of the tunnels which everywhere abound, and which form so characteristic a feature of Italian railroads.

Section of line.	Length of line.	Descriptive notes on gradients.	Particulars of tunnels.
	Miles		
Turin to Genoa via Alessandria.	102½	Descends at 80 ft. to mile between Ronco and Sampiardarena.	Between Arquato and Genoa (25¾ miles) there are 23 tunnels; longest is Ronco Tunnel, 8,262 meters.
Genoa to Pisa (coast line).	102½	Fairly easy route.	18 tunnels between Genoa and Avenza (72 miles); three of them each over 3,000 meters and 13 over 1,000 meters.
Modane to Turin (Mont Cenis line).	65¼	Worst gradien's are between tunnel and Bussoleno, and are chiefly 125 to 150 ft. to mile descending.	29 tunnels between Modane and Bussoleno (37 miles); longest is Frejus, 13,700 meters.
Vintimille to Genoa (Riviera route).	93½	Easy line; numerous curves.	79 tunnels (none very long).
Ronco to Genoa (old Giovi incline route).	17½	Drops 182 ft. to the mile between Busalla and Pontedecimo.	8 tunnels; longest, Giovi, 3,256 meters.
Naples to Brindisi	211½	Grades of 125 ft. to the mile in long stretches near Nocera, Salerno and Baragiano.	53 tunnels; longest, Carotto tunnel, 1,795 meters.
Riggio to Battipaglia.	248	Grades of 65 to 85 ft. to the mile at various points.	76 tunnels; longest, S. Cataldo, 5,140 meters; three others over 3,000 metres.
Turin to Savona.	89½	Long descent near Sale Langhe at 125 ft. to the mile; less steep, but still very severe, elsewhere.	25 tunnels between Sale Langhe and Savona (24¾ miles); longest is Belbo, 4,247 meters.
Alessandria to Savona.	63½	Descends 125 ft. to the mile from San Giuseppe to Savona.	22 tunnels between San Giuseppe and Savona (12½ miles); longest, Sella, 2,309 meters.
Asti to Genoa.	64¼	Grades of 85 ft. to the mile at Campoligure and Ovada.	26 tunnels, Ovada to Genoa (27 miles); longest, Turchino, 6,432 meters.

The general arrangements of the Italian railroads for the comfort and convenience of passengers cannot be described as good. The stations are dirty, especially in the country districts, and the waiting-rooms, or at any rate that for the third-class passengers, are uncomfortable. The large towns and the important junctions, are, however, somewhat better off, and tolerably good buffets are usually provided. At Turin and Milan, indeed, stations are really very fine structures and quite fit to take their stand with the leading stations of other European countries. Genoa, Rome and Naples have also good accommodations, but Florence is very badly off.

The carriage stock of the Mediterranean railroads does not merit high praise. The third class is miserable all over the system and is quite unfit for anyone from the States or from England to travel in. There are neither cushions nor side windows, and rarely any luggage-racks and the vehicles of this class are generally very dirty. As a rule they are mounted on four wheels and only weight about 10 tons, and the space awarded each passenger is small. This is also true of the first and second-class vehicles running on the branch lines. These, although provided with cushions and side windows, are often stuffy and not clean.

The main line vehicles, chiefly first and second class (third class rarely being carried on the fast trains), mark a distinct improvement. The vehicles are heavier, the space allowed each passenger reasonably sufficient, lavatory accommodation is provided, and the general upholstering and decoration pleasing and comfortable. Two luggage racks, the lower for umbrellas, etc., are usually found, and the floor is covered with carpet or with matting. Steam heat and lighting by gas have recently been somewhat extensively introduced into the express trains, so that first and second class travel in the faster Italian trains is not uncomfortable.

The Mediterranean Company has quite a bewildering number of locomotive types. The Album delle Locomotive, issued by the company's Locomotive Department in 1888, shows no fewer than 66 separate types, and appendices issued since, bringing the album up to date, add to this already large variety. These include locomotives with single driving wheels, four-coupled express engines, four and six-coupled types for slow passenger, mixed or goods trains, eight coupled mountain locomotives, shunting engines and four coupled tank locomotives for use on secondary lines. It will suffice here to notice the dimentions of the most recent express type. This is a four-coupled bogie engine, with 17¾ × 24⅜ cylinders, 6 ft. 10¾ in. driving wheels. The heating surface is 959¼ sq. ft. (tubes) and 107½ (firebox) and the boiler pressure 150 lbs. to the square inch. The weight in working order is 43 tons, of which 29½ tons is on the coupled wheels. The writer has made several trips behind these engines, but, owing to the very low average speed attained on the Italian lines in express service, nothing remarkable in the way of fast running was noticed. They should, however, be capable of excellent work. The tender is on six wheels and weighs, ready for service, 27½ tons. This type is officially known as "Gruppo, 1701—1800."

Express speed in Italy is not very highly developed, the trains on the main routes connecting such towns as Turin, Genoa, Milan, Rome and Naples rarely touching an inclusive rate of 35 miles an hour, although described by such words as "Diretto" and "Direttissimo." Punctuality could be improved by smartening up the station working, which is often almost ridiculously slow, viewed from an English standpoint. As regards amount of express speed, an investigation similar to that conducted for the lines of the Belgian State railroads, and published in the *Railroad Gazette* of Nov. 5, has been undertaken with the view of obtaining the *exact* amount of speed on this system from the official working timetables of the Mediterranean Company. Besides stating the train arrival and departure times, these timetables give the distances between stations to the hundredth part of a kilometer, the gradients and a mass of useful information concerning the weights of passenger vehicles, train loads, maximum speed for the various types of locomotives, etc., together with very neat maps of the Mediterranean system. Having fixed a speed limit of 35 miles an hour as the minimum for an express train, a careful scrutiny of these timetables gave the following results, which, it will be seen, are not even so good as the comparatively poor record of the Belgian lines (published on Nov. 5 in the *Railroad Gazette*).

No. of runs.	Description.	Daily mileage.	Minutes allowed.	Average speed.
145	35 to 40 miles an hour..	2,338	3,803	36.89
7	40 to 45 miles an hour..	201	294	41.02
152	All over 40 m. p. h.....	2,539	4,097	37.18

(*b*) *Spain.**—Here again we find, as in Italy, though perhaps scarcely controlling the lines of the country to so great an extent, two large systems, the Norte, which serves the northern half of the peninsula, and the Madrid, Saragossa and Alicante, controlling many of the lines of the south of Spain. We will deal with the former only here.

The most important line of the Norte connects with the Midi of France at Hendaye and Irun, the Midi bringing their trains into Irun on the standard 4 ft. 8½ in. gage, and the Norte running its own rolling stock over the French frontier to Hendaye on the 5 ft. 3 in. gage usual in Spain. For the short distance between Hendaye and Irun one thus sees the unusual sight of a double track line with each track of a different gage. From Irun to Madrid via Vittoria, Burgos, Valladolid and Avila is single line all the way, and so is the loop from Medina del Campo via Segovia to Villalba. This great main track sends off spurs at Miranda for Bilbao, and at Venta da Baños for Santander and for Oviedo and Gijon, the latter line having an important branch from Leon to Coruña. The extensions from Vittoria and Miranda eastward to Barcelona via Saragossa and Lerida, and the coast route from Barcelona through Tarragona and Valencia southwards, are important parts of this large system, which has a total length of just over 2,000 miles.

In such a mountainous country as Spain it is only natural to expect severe gradients and numerous tunnels, and these are found in plenty. The Irun-Madrid line at once commences to rise from almost sea level and attains nearly 2,000 ft. above sea at Otzaurte (about 35 miles away), the line hereabouts being frequently in tunnel through the Cantabrian Mountains. Then there is a slight descent to Miranda (100 miles), followed by a steady ascent to Quintanapalla, near Burgos (160 miles), which is 2,950 ft. above sea. From this point the line keeps well above 2,000 ft. above sea level all the way to Medina del Campo (270 miles from Irun) and then steadily mounts through Avila to cross the Sierra de Guadarrama, keeping along the hillsides among wildernesses of stones and rocky boulders until it reaches the culminating point at La Cañada, 4,400 ft. above sea and just at about the same elevation as the highest point of the Brenner Railroad, between Innsbruck and Bozen. An uninterrupted drop for 60 miles brings us to Madrid, 400 miles from Irun, and 1,900 ft. above sea. The loop from Medina del Campo crossing the Guadarrama via Segovia attains nearly as high an elevation (4,300 ft.) at Espinar and then drops to Villalba, where it joins the other line.

Interesting as this route is from both a scenic and engineering point of view, it is yet surpassed by the spur lines which leave the main trunk at Miranda for Bilbao and at Venta da Baños for Santander and for Oviedo. The characteristic feature of all these lines is that they ascend on leaving the main line in order to cross the Cantabrian chain or the mountains of Asturias, and then descend with great sharpness to the seacoast through numerous tunnels and on grand reverse curves. Especially is this the case on the line from Venta da Baños to Santander, where, between Pozazal and Los Corrales, a distance of 37⅛ miles, the line drops 2,900 ft. At one point, amid magnificent scenery, four different levels of the line are visible, and between Reinosa and Barcena, 20½ miles, there are no fewer than 22 tunnels. This, however, is quite eclipsed by the descent from Busdonga to Ujo on the line from Leon to Gijon. Busdongo is about 4,200 ft above sea and Ujo (39 miles away) only 950 ft. This section is one of the most remarkable lines of railroad in Europe, as, between Busdongo and Puente de los Fierros, only 26⅛ miles, there are no fewer than 60 tunnels with an aggregate length of 14¼ miles.

The other lines of the Norte do not call for any special description, although a good deal of climbing has here and there to be done by the locomotive. Perhaps the worst section is the 29-mile climb (rising 1,750 ft. in the distance) out of Manresa on the Barcelona and Saragossa line, dropping thereafter 1,850 ft. in 45 miles to Lerida.

The accommodation provided for passengers by the Norte of Spain is inferior perhaps to that given in any other European country. The wayside stations give much the same inferior accommodation as one finds in Italy, waiting rooms and sanitary arrangements often leaving much to be desired. Few of the larger towns and junctions have good accommodation, the stations at San Sebastian, Valladolid and Madrid being perhaps the only satisfactory ones, and even these are built to the same model as that so frequently seen on the Midi of France. The trains make frequent stops of 20 to 30 minutes for refreshment purposes, and meals in the Spanish style can be had at tolerably low prices in the "comedor" or dining-room.

The passenger rolling stock, like the stations, cannot be awarded commendation. The firsts are exactly like French firsts, being upholstered in white cloth on both the walls and roof of the compartments, and might, with their side windows cut away, be very easily mistaken for stock belonging to the Midi of France. Lavatories, except in special coupés or in a few recently built side corridor vehicles (upholstered in red velvet), are not provided. The second-class accommodation is very poor. The seats are badly cushioned and are, by reason of the wider Spanish gage, expected to accommodate six persons, each side, instead of five, or, as in some countries four only. The thirds are very rickety carriages, some having been on the road for 30 years or more. They are destitute of all conveniences and below even the standard found in Italy. The average weight of Spanish vehicles ranges from 5½ to 10½ tons. They are almost invariably on four wheels only. An exception, of course, is the vehicles used in the Sud express, which are, however, supplied by the Wagon-Lits Company, and can only be used on payment of a heavy, extra fare.

The dimensions of the locomotive stock are given in the subjoined table:

Description of locomotive.	Cylinder dimensions.	Heating surface.	Diameter of driving wheels.	Total weight.		Weight on coupled wheels.		Approximate number of locomotives of each type.
	Inches.	Sq. ft.	ft. in.	Tons.	Cwts.	Tons.	Cwts.	
4 coupled passenger	17½ × 22⅝	1,474.4	5 7	41	2	28	4	215
6-coupled goods and mixed trains	17½ × 23⅝	1,493.6	4 11	38	18	38	18	275
8-coupled (for heavy grades)	19¾ × 26	1,741.5	4 3	48	4	48	4	145

There is practically no such thing as real express speed in Spain. Trains jog comfortably along at from 15 to 25 miles an hour, stopping at nearly all stations, and once the passenger gets accustomed to it and realizes that he is in a country where hurry is not tolerated, traveling, if done in a first-class carriage, is not unpleasant. Our scrutiny of the working timetables of the Norte for a long time failed to disclose any trains whatever which, from one stopping point to the next, attained 35 miles an hour for express speed. In fact, were one or two trains running on certain days of the week only, such as the Sud-express, eliminated, one might almost say that there was no speed at all on the Norte of Spain at 3 miles an hour. Punctuality also is frequently disregarded, although it is hard for a train to be late, as they have so much time allowed. Before presenting our speed-table it may be stated that the working time tables from which the record is taken are arranged differently from the usual plan. Instead of having the stations in a column on the left and each train having a separate column in which its schedule time is shown the Norte working books give a separate page, together with distance and station columns, to each separate train. The result is that each section of the line has quite a large working book devoted to its train services. We now give the speed table referred to above:

	Regular daily trains.	Trains, such as Sud express, running only on certain days of the week.	Total
Number of runs exceeding 35 miles an hour.....	5	15	90
Mileage.....	38¾	215½	254¼
Minutes allowed.....	64	363	427
Average speed in miles per hour.....	36.53	35.62	35.73

* The reader is referred to a letter in our issue of Jan. 3, 1896, for a very entertaining account of railroad travel in Spain.

Metal Sheathing for Passenger Cars.

At the last meeting of the Master Car Builders' Association, Mr. Appleyard described a passenger car on the New York, New Haven & Hartford,* the exterior of which was finished with sheet copper instead of the usual finish of paint and varnish; no paint or varnish was used on the outside of the car body, excepting on the roof, platforms, hoods and window sash. This car was put in service Jan. 18, 1897, between New York and Boston, and Mr. Appleyard now advises us that the new finish has given satisfactory results, and that after a year in service the car has quite as good an appearance as when it first left the shop.

A coach on the same road is now being covered with aluminum bronze, and a third with sheet aluminum. The aluminum bronze finish will weigh practically the same as the copper, while the weight of the aluminum will be about one-third that of the copper finish. It is expected, however, that the aluminum-covered car will cost more than would a similar car newly painted and varnished, but the difference in cost will be quite small.

The new method consists of covering each piece of wood sheathing, paneling, belt rails, letter boards, etc., with the sheet metal before applying the parts to the car, so that the metal fits tightly the wooden pieces. The sheathing is plated by means of a simple arrangement of rolls. Each piece of sheathing and its corresponding piece of metal is passed through the machine together and comes out ready for use, the metal fitting the tongue and extending into the groove at the sides. The sheathing is applied to the car in the usual manner, the grooved side being driven over the tongue and nailed so that the fastenings do not appear on the surface. The metal surface is not punctured in any place by the fastenings, and all joints are water tight. The numbers and letters on such cars are made of cast brass or aluminum as desired.

As previously stated, the first car turned out was covered with copper, and the cost of this car was about $50 more than it would have been had paint and varnish been used, but its cost was considerably increased because the process was new and the work was done slowly. It is stated that it requires from 800 to 900 lbs. of copper to finish an ordinary passenger car, and that the first cost of metal-plating cars need not exceed the cost of painting.

A saving can be made by using a less expensive grade of lumber with the metal finish than can be used under paint and varnish, and also with the new process the cars are less time in the shop; where it requires 28 days to finish a coach under the usual system, the same work can be done by means of the metal plating in 18 days. There is an additional feature of the new system, in that it is not necessary to shift cars from one shop to another, but all the work can be done with the car in one place, thus saving the cost of moving the car in the shops. It has also been found that it costs less for cleaning metal-covered cars in the yards than those finished with paint and varnish, while the appearance of the metal is not affected by service, as is the case with painted surfaces.

Seventy-Thousand Pound, Twin-Hopper Coal Cars.

The Northern Pacific has recently built 100 twin-hopper coal cars of 70,000 lbs. capacity in its shops at South Tacoma, Wash., from a design prepared under the direction of Mr. E. M. Herr, Superintendent of Motive Power of that road.

These cars are 30 ft. long and 8 ft. 8 in. wide over end sills, 29 ft. 3 in. long and 7 ft. 11 in. wide inside measurements, and 6 ft. 6 in. high from the bottom of the sills to the top of the plate; when loaded level with the top of the sides the capacity is 1,070 cu. ft. The total wheel base is 25 ft. 10 in. All the timbers entering into the construction are of Washington fir, and malleable iron castings are used for all the important cast parts of the car bodies.

* Also described in detail in the *Railroad Gazette*, Jan. 29, 1897, page 76.

Fig. 1 is an elevation, plan and sections of one of these cars in which the principal features of the construction are clearly shown. It will be seen that the underframe is made up of two 5 × 13 in. side sills, two center sills, 7 × 9 in., and 6 × 13 in. end sills. The center sills are

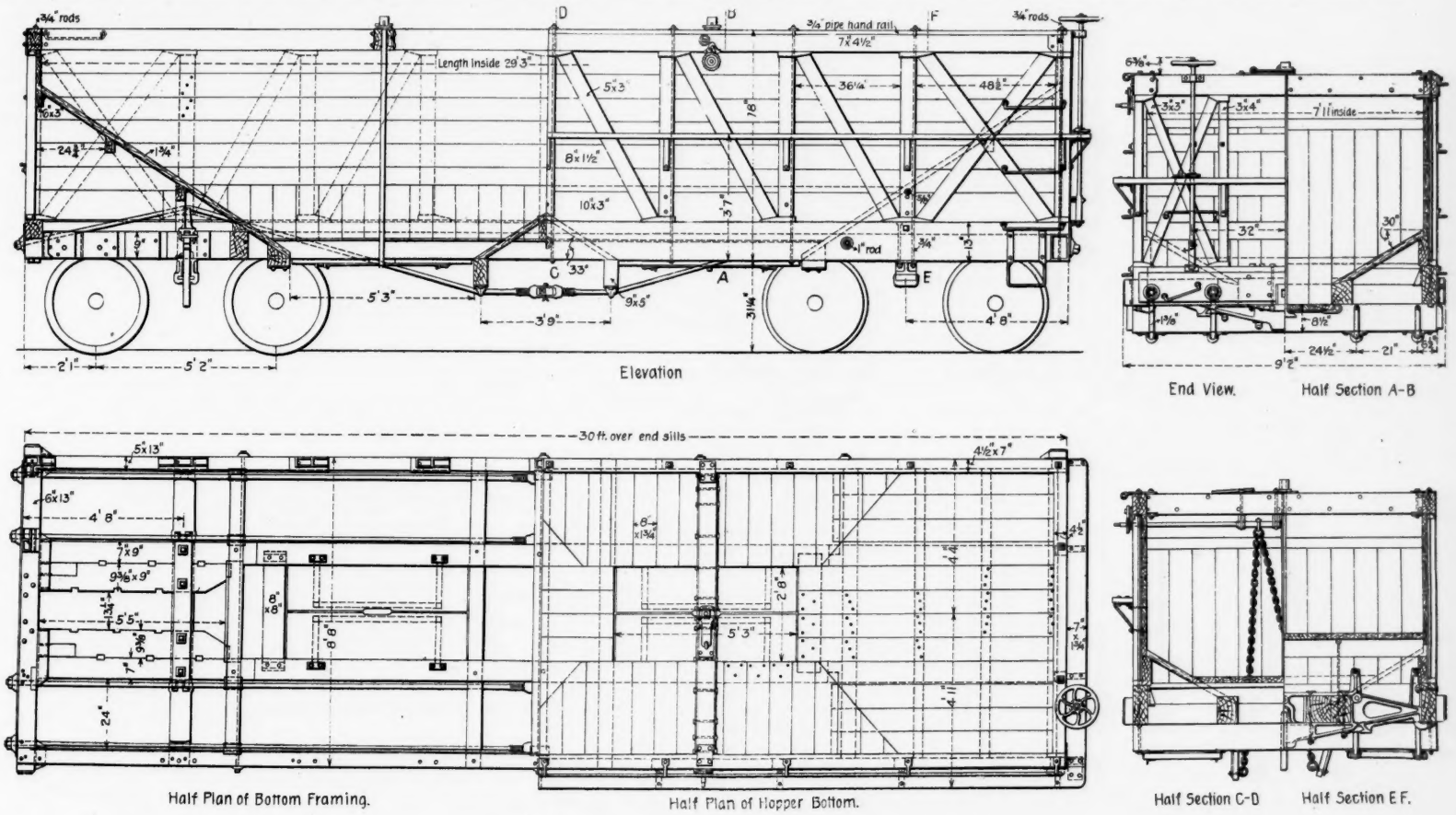


Fig. 1.—70,000-lbs. Capacity, Twin-Hopper Coal Car—Northern Pacific Railroad.

spaced 3 ft. 3 in. center to center to make room for the hoppers. The hoppers are supported longitudinally by the center sills and by timbers, 3 × 10 in., which rest on the side sills; transversely the hoppers are carried on cross timbers. The hopper floors are of 1¼ × 8 in.

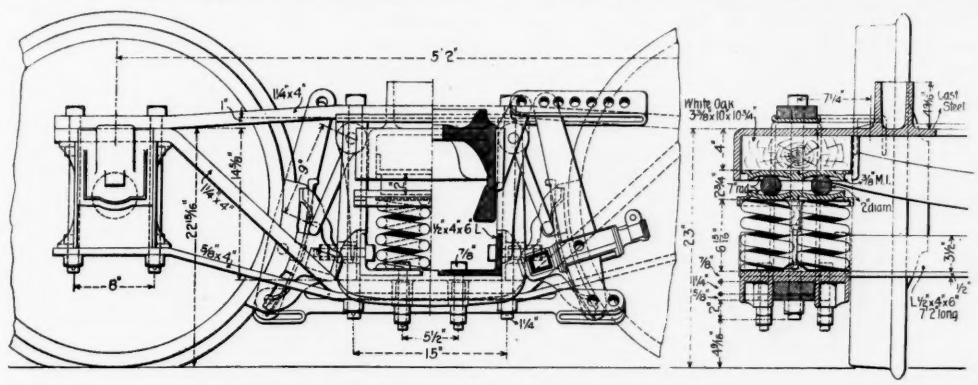


Fig. 2.—Barber Truck—Northern Pacific Railroad Coal Car.

plank, while the sides are of 1⅛ × 8 in. material. Each hopper is provided with double drop doors which are covered with steel plates, and are operated by means of a ratchet wheel and chain.

The draft timbers are protected by pressed steel plates and are bolted and keyed to the center sills; double drawbar springs, 6 × 8 in., are used in connection with Trojan couplers. The end sills are cut out around the drawbar and are plated with ⅛ × 10 in. steel plates. Four 1⅜ in. truss rods are used, one alongside of each longitudinal sill. The side posts and struts of the upper framing are 3 × 5 in., and the side and end rails are 4½ × 7 in. timbers. Malleable iron castings are used to form the connections. The body bolsters are of malleable iron and their construction is clearly shown in Fig. 1. The cars are equipped with Westinghouse air-brakes and detachable auxiliary reservoirs.

The trucks, as shown by Fig. 2, are entirely of metal, have low diamond frames, and are of unusual design in that the principal features of the American Steel Foundry Co.'s truck and the Barber truck are combined. The first truck of the American Steel Foundry Co. was illustrated in the *Railroad Gazette*, May 24, 1895, and a later design, May 7, 1897; the details of the Barber truck have been shown before in our issue of May 15, 1896.

The American steel truck bolster with center plates and side bearings cast together is used on the Northern Pacific cars (see Fig. 3), but instead of the bolster being carried directly on end springs, as in former designs, two 2-in. steel rollers, 10 in. long, with suitable seats, are introduced under each end of the bolster; the rollers in turn are supported by a nest of four coil springs. The rol-

steel angles; the lower bolts securing these angles pass through the lower arch bar, the tie-bar and spring seat and are in addition to the usual column bolts. The angles are also bolted to the columns at the sides. The trucks are fitted with inside-hung brakes and Kewanee brakebeams, the brake hanger bracket being malleable iron.

Track Elevation in Chicago.

At a meeting of the Chicago City Council, Jan. 24, an amendment was added to the ordinance passed July 9,

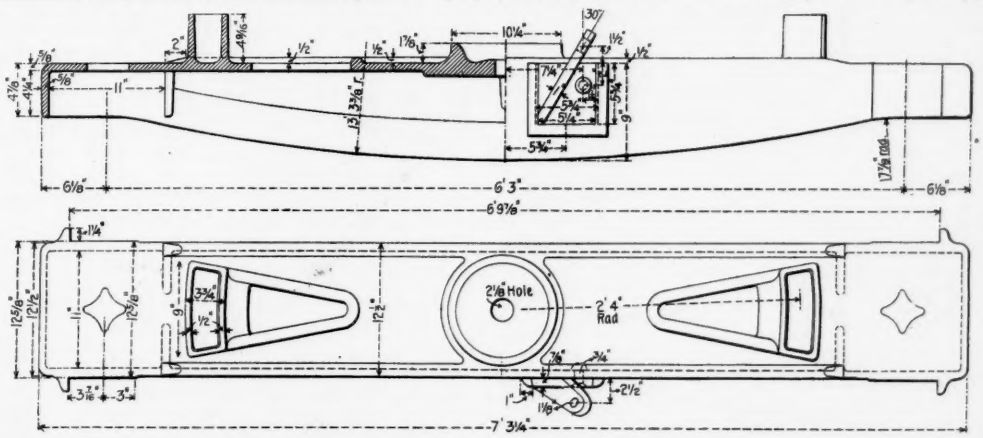


Fig. 3.—Half Section, Half Elevation and Plan Views of Truck Bolster.

1894, providing for the elevation of the tracks of the Chicago, Rock Island & Pacific and the Lake Shore & Michigan Southern. By the terms of the original ordinance the southern limit of the track elevation on the Chicago, Rock Island & Pacific was at Sixty-seventh street, and this ordinance has now been amended so that the last subway on the Rock Island will be at Seventy-sixth street. This extension of the work, which is about one mile long, will make necessary the construction of eight subways in the following streets: Sixty-ninth street, Seventieth street, Seventy-first street, Seventy-second street, Seventy-third street, Seventy-fourth street, Seventy-fifth street and Seventy-sixth street. (See *Railroad Gazette*, Nov. 6, 1896, and Jan. 14, 1898.) The railroad is given 60 days from the date of passage in which to file its acceptance of the amendment.

At the same meeting two ordinances were passed, providing for the elevation of certain tracks south of Twelfth street. The first of these provides for the elevation of the main line of the Chicago, Burlington & Quincy from the entrance to the Hawthorne yard, and overhead crossing of the Chicago & Western Indiana, at the west line of the city limits, to a point on the west right of way line of the Pittsburgh, Cincinnati, Chicago & St. Louis, where the Chicago, Burlington & Quincy tracks will descend so as to pass under those of the Pittsburgh, Cincinnati, Chicago & St. Louis, Chicago Terminal Transfer and the Union Stock Yards & Transit Company in Campbell avenue, which tracks in turn are to be elevated. A viaduct will be constructed adjacent to this crossing to carry South Western avenue over the Burlington tracks. Commencing at the east side of South Western avenue the Chicago, Burlington & Quincy tracks will be raised, and the elevation will extend beyond Lafin street, meeting the present grade under the Blue Island avenue viaduct. Provision is also made for elevating the connecting line of the Chicago, Burlington & Quincy, which runs from its junction with the main line, near Twenty-first street, parallel to and east of the Pittsburgh, Cincinnati, Chicago & St. Louis and Union Stock Yards & Transit Company tracks to Twenty-sixth street, where it diverges. This branch will be raised between Twenty-first street and Twenty-sixth street, and will cross the branch line of

the Atchison, Topeka & Santa Fe at the new grade, the latter road being elevated on an open trestle for short distances on either side of its crossing with the above-named roads.

The present viaduct at Ogden avenue will be taken down and the elevation of the tracks of the Chicago & Northwestern and the Chicago Terminal Transfer, which was done under the Rockwell street ordinance, will be continued, meeting the present grade at the Blue Island avenue viaduct; from Lincoln street east to Blue Island avenue these roads run adjacent to the main line of the Chicago, Burlington & Quincy. The Metropolitan West Side Elevated structure will be raised where it crosses the Chicago, Burlington & Quincy, Chicago & Northwestern and Chicago Terminal Transfer tracks between Paulina street and Wood street.

Also, continuing the track elevation now completed in Rockwell street, the parallel tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis, Chicago Terminal Transfer and Union Stock Yards & Transit Company, will be elevated south, crossing on an overhead bridge the main line of the Chicago, Burlington & Quincy, and crossing at grade the branch line of the Atchison, Topeka & Santa Fe at Twenty-sixth street and joining the roadbed already elevated at Thirty-first street; the subway in Thirty first street is now built. The crossing of the main line of the Atchison, Topeka & Santa Fe south of Thirty-first street is now protected by an extensive interlocking plant, which will not be disturbed.

The railroad companies above named are given 30 days in which to accept this ordinance, and it is provided that the work of the Metropolitan West Side Elevated shall be completed within 90 days after the acceptance of the ordinance, while the entire work shall be finished by Dec. 31, 1902.

The second ordinance, passed Jan. 24, provides for the elevation of the tracks of the Atchison, Topeka & Santa Fe, the Chicago, Madison & Northern and the Chicago & Alton, commencing at a point under the Eighteenth street viaduct and continuing south and west to Ashland avenue, where the Chicago & Alton tracks diverge; the Chicago & Western Indiana and Pittsburgh, Fort Wayne & Chicago tracks near Twenty-second street will be crossed at the new grade, plans having already been made for elevating the two last-named roads. The elevation of the Chicago & Alton tracks will continue from Ashland avenue to Rockwell street, crossing at the new grade the tracks of the Pittsburgh, Cincinnati & St. Louis, Chicago Terminal Transfer and Union Stock Yards & Transit Company. The Atchison, Topeka & Santa Fe and Chicago, Madison & Northern elevation will be continued from Ashland avenue west and will meet the present grade about 10 ft. east of the bridge over the Illinois & Michigan Canal. The tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis, Chicago Terminal Transfer and Union Stock Yards & Transit Company will be elevated, beginning at a point south of the present bridge over the Illinois & Michigan Canal and extending south to a point beyond Western avenue boulevard, where the tracks will descend. Thirty days are given from the passage of this second ordinance in which it shall be formally accepted by the railroads, and it is provided that the work shall be commenced on or before May 1, 1898, and completed by May 1, 1900.

The first ordinance named calls for one viaduct, one overhead bridge over the Chicago, Burlington & Quincy tracks and 44 subways at street crossings; the second ordinance includes 41 subways at street crossings. On account of the location of the tracks named the greater part of the work will have to be done by the roads working in conjunction. The length of roadbed which will need to be elevated to meet the requirements of these two ordinances is approximately as follows:

	Miles.
Chicago, Burlington & Quincy	6.25
Chicago Terminal Transfer	6.00
Chicago & Northwestern	1.75
Pittsburgh, Cincinnati, Chicago & St. Louis	3.25
Union Stock Yards & Transit Company	3.25
Atchison, Topeka & Santa Fe	3.00
Chicago & Alton	4.50
Chicago, Madison & Northern	2.50
Total	30.50

The estimated cost of the entire work is nearly $12,000,000.

New Boston & Maine Shops at Concord.

[WITH AN INSET.]

The tendency in all manufacturing enterprises is toward consolidation of work and of management for the purpose of economizing in operation. In railroad as well as in manufacturing shop practice this appears in the concentration of the work requiring special facilities at points where such facilities may best be provided and most satisfactorily operated. There is good business management in the plan that contemplates a few well-equipped shops rather than a much larger number of less complete and less convenient plants, the number of which renders completeness too expensive for consideration. An important Western road, when installing a new hydraulic riveting plant, made it large enough to do the heavy boiler and firebox work for the locomotives of the entire road, thus finding justification for a large expenditure. There appears to be a strong tendency in this direction, though for several years few large shops have been built.

The new shops of the Boston & Maine at Concord, N H., are particularly interesting for these and for several other reasons. The buildings, except the storehouse and offices, are all of one story. They are arranged with a view of convenience in handling material and of furnishing light to the workmen; the buildings are separated as much as is consistent with convenience for the purpose of reducing the fire risks, and provision is made for the future extension of every building. The most noteworthy feature, however, is the concentration of the steam plant in one building and the distribution of power by electricity. This part of the work will be taken up in detail later, in connection with the power house and machine shops and the cranes for handling the locomotive work. The general plan and sections of some of the buildings are illustrated in the inset given herewith. Mr. Henry Bartlett, Superintendent of Motive Power of the road, kindly furnished the drawings and the information given in this description, which is published simultaneously in the *American Engineer* and the *Railroad Gazette* by special arrangement.

The shops are situated about a half mile south of the station at Concord, occupying a level plot of 26 acres extending along the west side of the main tracks. There are three main tracks at this point, and a fourth gives access to the yard at Concord independent of the main tracks. The repair work of the Concord, the White Mountains, the Worcester, Nashua & Portland, and that of a part of the Southern division will be done here. The number of locomotives cared for will be about 300. The capacity of the car shops is about 400 freight cars and 50 passenger cars a month. The buildings alone occupy 4.63 acres of ground.

As shown in the large general plan of the grounds the tracks are arranged to give access to the shop yard at the center and at each end; and the whole yard is accessible for locomotives. As stated, the buildings, with the exception of the storehouse, are all of one story—with the exception of the lumber shed they are all of brick. The roofs of the paint shop, the lumber shed, the car repair shops and the oil storehouse are all of gravel, while those of the other buildings are of sheet steel, with standing seams. The buildings are all provided with ends that may be removed, for the purpose of easy extension, when this becomes necessary. It will be noted that the location of the buildings provides for extension in length in either direction.

The locomotive shop is at the north end of the plant, the main portion of the building being 305 ft. × 130 ft. to which an extension, 105 ft. × 70 ft., is added for the boiler and tank shop. This arrangement permits of running the locomotive cranes from the main locomotive shop directly into the boiler and tank shop, the advantage of which is at once apparent. The erecting shop has three longitudinal tracks, the central one of which runs through the building and through the boiler shop as well. Upon this track the engines will be dismantled, and the two 30-ton Sellers traversing cranes will take them to the work tracks on either side of the central track. All three tracks are provided with pits for work under the engines. The machine shops are in the wings of the building, and are therefore near the work. This building will be illustrated later. It should be stated that the three longitudinal tracks offer the advantages of avoiding the expense and trouble of operating a transfer table as well as saving the space occupied by the pit, which would be required for the transverse track arrangement; also with transverse tracks one very heavy crane would be required for raising locomotives, and it could not be so conveniently used for light work as are the two lighter cranes of the longitudinal track plan. With two cranes available for work in different parts of the building, when not required for handling engines or boilers, the general work of the shop may be facilitated. The crane service of such a plant is an important matter, as it affects the cost of all of the heavy work and much of the lighter work. It is in this particular that one often notices a marked contrast between railroad shops and contract building establishments.

The wash building, near the locomotive shop, is 62 ft. × 26 ft. and accommodates 150 men at once. This building is for the men in the locomotive and blacksmith shops, and is so placed as to be conveniently in the path from these shops to the gate of the grounds. The north end of this building contains tanks for removing the grease from the running gear of the locomotives, a brick partition separating the parts of the building. An attendant looks after the sanitary and mechanical work of the building. West of the washhouse is the lumber shed, a frame building, 300 ft. × 40 ft., with a track on each side. This building is removed as far as possible from the other buildings to reduce the fire risk. It has a storage capacity for about 500,000 feet of lumber.

The storehouse is a two-story building 100 ft. × 40 ft., and is accessible from two tracks, and also from a roadway for teams. The lower floor, as shown in the plan, has three platforms, one for unloading from teams and two for unloading from freight cars. A receiving and shipping room is provided at the north end, adjoining which is the store room for heavy material. A counter separates the store room from the vestibule at the south end, and the office for the storekeeper is in one corner of the building. The racks for the stores are adjustable, and, like the rest of the interior of the building, are of hard pine, with natural finish. In the upper story are the offices of the master mechanic and of the car department. At the north end of this floor is a large storage room for light stores, with independent stairs to the lower store room.

The blacksmith shop is opposite the storehouse. It is 100 ft. × 60 ft., and has 10 double forges and one large forge. There are four power hammers, two Bement & Miles steam hammers, one 1,200 lbs. and the other 1,800 lbs., one Dupont belted hammer of 250 lbs. and one Hotchkiss steam hammer of about 500 lbs. A bolt header, power shear and drill press are also located in this building. A 15 H. P. Westinghouse motor mounted on the roof trusses drives the blower and the exhauster and a 20 H. P. motor on the ground drives the other machinery.

The next group of buildings consists of the dry house, the planing mill, boiler and powerhouse (combined in one building) and the small shops. The dry house is 75 ft. × 25 ft., and is near the planing mill. Its floor is of old rails, and the steam piping is contained in an excavation of about 3 ft. deep below the floor. In this there is 8,000 ft. of 1½-in. piping, divided into eight sections, in order to permit of regulating the amount of heat. A section of this building illustrates its arrangement. The planing mill and power house join at their ends. The walls are of brick, and the roof trusses of the power house are of iron, while those of the mill are of timber. The mill is 300 ft. × 60 ft. and the power and boiler houses is 111 ft. × 65 ft. All of the engines, dynamos and boilers of the plant are concentrated here, and power is distributed to motors in the shops and to the transfer table. The whole plant is also heated and lighted from this point, the machinery being sufficiently interesting to warrant taking it up in detail in a future issue.

The cabinet, pattern, buffing, tin and pipe shops are all under one roof in a building 200 ft. × 40 ft., to which power is carried to drive a 5 H. P. Westinghouse motor. South of these buildings is a hand transfer table for light service for the car shops and the planing mill.

The freight and passenger car repair shops are in one building, 323 ft. × 170 ft., divided in the center by a fire wall. The freight-car work is done at the west end, where 32 cars may be repaired at once. The passenger car repair shop accommodates 16 cars. These shops are well lighted and ventilated.

The transfer table is located south of the car-repair shops, and is sufficiently removed from the buildings on each side to allow cars to stand between the pit and the buildings, the space provided being 82 ft. on each side. The pit is 280 ft. × 70 ft., and the table connects with the tracks leading directly from the locomotive shop. The table, which operates from an overhead trolley, was furnished by the Industrial Works, of Bay City, Mich. It is provided with winches, and the machinery is housed.

South of the transfer table is the paint shop, which is 238 ft. × 165 ft., and has space for 16 passenger cars and four locomotives. At the east end of this building are the varnish and upholstery rooms, each 81 ft. × 36 ft., divided from the main shop by a brick wall. The last building at the south end of the plant is the paint and oil storehouse, a building 50 ft. × 25 ft., with a cellar and arched floor.

The buildings are arranged with a view of avoiding unnecessary transportation of material, and those containing the machinery are so planned as to permit all work of one kind to be kept together. The electrical distribution will be described later, also the steam distribution. The steam, water and air pipes are carried through closed trenches to the various buildings, and are located as shown in the general plan of the shops and grounds. The drainage system is complete, and is connected with the city sewer, a branch of which passes through the grounds. The locations of the drains are also indicated on the plan. The compressed air piping is carried through the locomotive and car shops and yards, the power being furnished by an 8 in. × 12 in. duplex compressor furnished by the Rand Drill Company. The water-works are connected with the city mains, and there are two lines of water-pipes, one for fire service, carrying 110 lbs. per square inch, and the other for shop use, carrying 90 lbs.

The entire plant is heated by hot air circulated by fans, the fans being furnished by the Boston Blower Company, of Boston, Mass., on a guarantee to maintain the following temperatures in zero weather: Car repair shops, 65 deg.; planing mill, 65 deg.; cabinet and pattern shops, 70 deg.; small shops, 65 deg.; locomotive and boiler shops, 65 deg.; paint and varnish shops, 75 deg.; paint and oil store, 65 deg. The blower and exhauster in the blacksmith shop and the smoke fan for artificial draft in the power house were furnished by the same company.

The plans, specifications and details of this plant were drawn up by the motive power and car departments of the road, and the plans and specifications of the buildings were prepared in the Chief Engineer's department. The contractors were as follows: Buildings, Messrs. Mead, Mason & Co., of Boston; iron work, the New England Structural Works, Boston; shafting, Somersworth Machine Company, Boston; electric machinery, the Westinghouse Electric & Manufacturing Company, Pittsburgh; steam and air piping, Coffin & Co., Boston; heating, the Boston Blower Company, Boston; transfer table, Industrial Works, Bay City, Mich.; cranes in locomotive shop, William Sellers & Co., Philadelphia; steam pipe covering, the Keasbey & Mattison Company, Ambler, Pa.; boilers, Edward Kendall, Boston; engines, the Westinghouse and the Fitchburg Steam Engine Companies, and Messrs. Armington & Sims.

Mr. C. H. Wiggin, Master Mechanic, is in charge of the locomotive department, and Mr. J. T. Gordon of the car department.

Beecham's Car Record.

Mr. W. E. Beecham, Car Accountant of the Chicago, Milwaukee & St. Paul, has now in use, and has patented, a plan of keeping his record of freight car movements which "abolishes books, pens, ink and pencils." Records are kept on small tags hung on pegs, and the pegs are so placed on large boards as to be always in view. Mr. Beecham sends us the following description:

"We substitute for the usual apparatus and implements typewriter machines fitted with an attachment for holding a roll of paper tape. This tape is an inch wide, and is perforated so as to make detachable tags exactly one inch square, each having a hole punched through it at one end for the purpose of hanging on a pin. The number of the car, together with the number of the train, the number of station from which car was taken and at which left, the date of movement, all taken from the conductor's report, are printed on the tag by the typewriter operator. The tags are then separated and each is hung on a pin in a square on a blackboard. These blackboards are 8 ft. long and 3 ft. 8 in. wide, and are set up on horses at a convenient height from the floor, in sets of two, in the form of an inverted 'V.'

"The boards each contain 2,550 spaces 1¼ in. square, so that two boards will provide space for 5,100 cars. The pins are about 6 in. long and removable. They are made of aluminum, with a collar about one inch from the lower end to prevent them from going through the board. One set of boards, with pins complete, having a capacity for 5,100 cars, weighs about 100 lbs.

"The tags used are of various colors, indicating as follows: A white tag for a loaded car moving on the home line, and a yellow one for an empty. Red is for a car delivered to a connecting line, and blue for a car returned. Red and blue tags show car numbers, numbers of station and date of delivery or return as the case may be. Pink indicates a vacant number. A green tag represents a junction movement between roads.

"The freight car equipment of the C., M. & St. P. consists of about 30,000 cars, separated into nearly 25 different classes. Each class, as, for instance, box, stock, furniture, platform, refrigerator or coal, has assigned to it a particular section of a board, so that the car distributor can obtain information as to the location and service of any of the various kinds by running the eye over that section of the board where the group is to be found. Each pin contains a complete history of the movements of an individual car on the home line and the junction movements to and from other lines for about 2½ years. The pins being removable, the tracing clerk can take one or more of them from the boards (substituting other pins for them, so as not to interfere with the work of making the record, which must go on uninterruptedly) and thus make his tracings of time freight or other movements without obstructing the work of others. This obviates what is known as 'lost motion' in ordinary records; that is, interfering with the progress of making the records while obtaining information, which occasions a great loss of time.

"Many features of the new plan are virtually automatic. For instance, tags only accumulate on the pins when cars move, so that the more expeditiously they move the faster tags will accumulate. Cars making but few movements have but few tags on the pins assigned to them, and this is automatically disclosed to the eye at a glance. In no other system can the movements of cars be thus mentally grasped at a glance. This enables the distributor to spot the idlers.

"In addition to the local boards, one set of boards (two in number) 4 ft. long and 2 ft. wide, is used for keeping a record of the number as well as the numbers of cars on other lines. These boards are placed on a table in the form of an inverted V, one side being used exclusively for cars charged to direct connections and the other for cars charged to indirect connections.

"Tags showing the car numbers, each showing date of delivery and number of station at which delivery was made, are placed on pins in numerical order, 10 pins being allotted to each direct connection, each pin containing the numbers of all cars in a certain series of numbers, pins being ranged perpendicularly on the board from 1 to 10, and in alphabetical order from left to right. When cars are returned from connecting lines the tags are removed and destroyed; likewise when a car passes from one line to another the tag is removed from the delivering line's pin, thrown away and a new tag placed on the pin assigned to the road last in possession of the car.

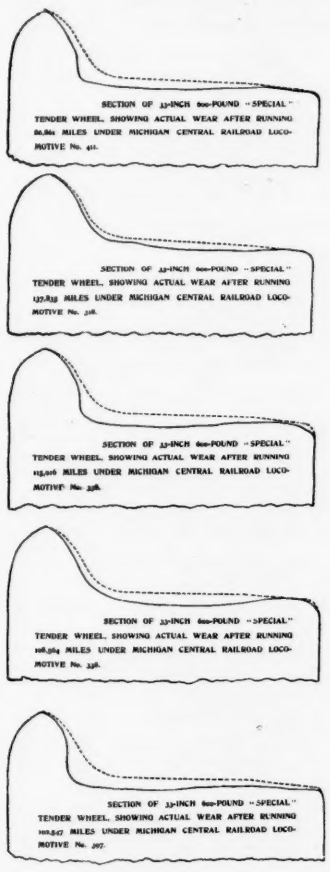
"The interchange board shows at all times how many cars are in possession of other roads, both direct and indirect connections. A count can be taken any day, or as often as required, and the usual statements (weekly or monthly) can be quickly made. Tracers for cars absent from home lines can be quickly made up and mailed, all the work being done without the use of a single pen or a drop of ink. It has been demonstrated by actual experiment that an expert typewriter operator will do three and one-half times as much work in a day as a man can do with a pen.

"As previously explained, a typewriter is used for printing the records of cars on the tags. It would not be practicable to do the work in any other way for many reasons, but principally for the reason that it would require four times as much labor to put the necessary information on the tags with a pen and ink, and then it would not be as legible. The tag, small as it is, contains more information than the book record, and the record of a car for a relatively long time occupies but very little room. A car traveling 70 miles a day for 115 consecutive days only showed an accumulation of tags on the pin half an inch in thickness. On this showing it would be possible to preserve the record of a car before you for three years at least before it would be necessary to file any part of it away for future reference, and if records are preserved for seven years but little space will be required. The work of filing away will be so infrequent as to be a matter of little concern."

A Chilled Wheel Record.

The P. H. Griffin Machine Works, of Buffalo, has recently distributed a pamphlet showing something of the record of certain special charcoal iron chilled wheels made by the St. Thomas Car Wheel Works, of St. Thomas, Ont., for use on the Canada Southern Division of the Michigan Central Railroad. These wheels were made under the system of manufacture used and controlled by the Griffin Machine Works. They have been in service under tenders and trucks of the 10-wheel locomotives hauling fast trains on the Canada Southern Division. The trains are heavy, as well as fast. The average speed, including stops, is 55 miles an hour, which necessitates a maximum speed frequently of 75 miles.

When these engines were built, the trucks and tenders were equipped with steel-tired wheels. When some of these wheels had to be replaced the special chilled charcoal iron wheels described were put in. These are 33-in.


SECTION OF 33-INCH 600-POUND "SPECIAL" TENDER WHEEL, SHOWING ACTUAL WEAR AFTER RUNNING 80,861 MILES UNDER MICHIGAN CENTRAL RAILROAD LOCOMOTIVE No. 401.
SECTION OF 33-INCH 600-POUND "SPECIAL" TENDER WHEEL, SHOWING ACTUAL WEAR AFTER RUNNING 137,835 MILES UNDER MICHIGAN CENTRAL RAILROAD LOCOMOTIVE No. 308.
SECTION OF 33-INCH 600-POUND "SPECIAL" TENDER WHEEL, SHOWING ACTUAL WEAR AFTER RUNNING 115,016 MILES UNDER MICHIGAN CENTRAL RAILROAD LOCOMOTIVE No. 358.
SECTION OF 33-INCH 600-POUND "SPECIAL" TENDER WHEEL, SHOWING ACTUAL WEAR AFTER RUNNING 108,564 MILES UNDER MICHIGAN CENTRAL RAILROAD LOCOMOTIVE No. 358.
SECTION OF 33-INCH 600-POUND "SPECIAL" TENDER WHEEL, SHOWING ACTUAL WEAR AFTER RUNNING 100,847 MILES UNDER MICHIGAN CENTRAL RAILROAD LOCOMOTIVE No. 307.

The Wear of Special Chilled Wheels.

diameter, weighing 600 lbs., and guaranteed for 60,000 miles. They were made of special iron made from bog ores, by the Canada Iron Furnace Co., of Radnor Forges, P. Q. The pamphlet before us gives a record of the performance of these wheels up to Dec. 1, 1895, as we understand it. Out of 308 wheels removed, certain mileage made is as below:

122	wheels	have	made	between	60,000	and 75,000	miles.
97	"	"	"	"	75,000	" 100,000	"
32	"	"	"	"	100,000	" 154,437	"
1	wheel	has	made			181,446	"

Of the wheels removed, 55 were from trucks and the others from tenders. The mileage of the truck wheels ranges all the way from 39,092 up to 166,901. Of the total wheels removed from the trucks and tenders we discovered but 55 which gave a mileage of less than 60,000. The list published shows wheels removed on account of general repairs to locomotives and which were still in condition for further service. Those are included in the figures above. The Griffin company calls especial attention to the satisfactory service secured from these special wheels under serious conditions as to weight and speed, and asks for a comparison of these solid wheels with steel-tired wheels.

The Michigan Central had at the time of the record about 20 engines equipped with these special chilled wheels, and 39 engines of this type in service. Renewals of all steel-tired wheels have been made with chilled wheels whenever the former gave out. It is stated further that not one of the special chilled wheels has been removed for failure to do its work; they have been removed simply on account of wear.

London Underground Electric Railroads.

In addition to the numerous light electric railroad schemes which are on foot for construction in the present year in various localities if the necessary Parliamentary powers are secured, there are a number of underground electric railroad proposals for London itself. Some such schemes have been buried, and may never be heard of again, while others are now in a forward state of construction. The latter lines we have on several occasions briefly particularized in the *Railroad Gazette*.

The City & South London, opened about seven years ago, is the only line of this class in actual operation. Its success as an engineering enterprise is known, but the investor holding the ordinary stock is not able to congratulate himself very heartily so far. The company has paid small dividends for some years, but with its present 3½ miles length it is an exceedingly difficult matter to earn a steady two per cent. dividend. Every effort has been made to reduce the operating expenses, and every half year's figures show decreases in this direction. For the first half of the year 1897 the working expenses were 57.2 per cent. of the receipts. In these figures, however, there is included the cost of operating the hydraulic passenger lifts. If this item were deducted, the working expenses for the mentioned period would figure at 50.40 per cent. The management is now giving special attention to these lifts, and there is to be a change in the system. This change is from hydraulic to electric lifts.

The hydraulic lifts which have been in vogue ever since the line was opened and which are now to give place to electric elevators by Messrs. Easton, Anderson & Goolden, Limited, are at the King William street (city) terminus and other stations. In the generating station is the hydraulic machinery. The cylinder of the ram is 2 ft. in diameter, and the wrought-iron flange-jointed pipes, which convey the water at a pressure of 1,200 lbs. on the square inch, are nearly 1 ft. in external diameter. The engines which pump the water into them act automatically, being put in motion as the accumulator descends by loss of water at the lifts. The lifts are circular, carrying 50 persons at a time. Two such lifts work in the same shaft, 25 ft. in diameter. This is the system which is being superseded.

The receipts per train-mile and per passenger are both on the increase. The electric locomotive expenses showed a slight increase, but there were special reasons for this. The company is looking for a more prosperous state of affairs when the extensions which are now in progress at both ends of the line are completed. The works for these extensions are now making headway, tunneling operations being well in hand. The construction of the stations and line for the extension to Clapham and for the city extension, which will take the line further into the heart of the city of London, and thus secure a great deal of additional traffic, is under the supervision of Sir Benjamin Baker as Engineer.

The Waterloo & City electric railroad, which runs beneath the river Thames in two tunnels, one for the "up" and one for the "down" traffic, is now on the verge of completion. The railroad commences at Waterloo at a level of 36 ft. below the South Western Steam Railway, and then descends toward the river on a grade of 1 in 60. Under the river the line is level for about 300 yards, and it then rises at the rate of 1 in 88 toward the city. The top of the tunnels is about 24 ft. below the bed of the Thames. The line goes below the District Steam Railroad for a part of the distance. The cast-iron tunnels run parallel to one another at a distance of about 4 ft. The line is only about 1½ miles long. When the railroad is straight, or on a flat curve, the internal diameter of the tunnels is 12 ft., but where curves are sharp, the tunnels are enlarged to 12 ft. 9 in. diameter, so as to prevent the long bogie carriages fouling the sides. The station tunnels are of cast iron 23 ft. internal diameter.

The electrical equipment of the line has been carried out by Messrs. Siemens Brothers, Ltd., of London, the contract for the rolling stock being given to an American firm, Messrs. Jackson, Sharp & Co. Prof. Alex. B. W. Kennedy, who is the Consulting Engineer, advised the employment of trains of four coaches to each, with motors on the two end bogies. Each train when fully laden will weigh something like 72 tons. The trains will carry 220 passengers, and the distance (1½ miles) be covered in four minutes. A passenger train is to be run in each direction every three minutes. Details of the generating station plant are not yet forthcoming.

An interesting feature in connection with the construction of the Waterloo & City Line is the employment of a small electric tramway which hauled away the trucks of soil from the Greathead shields. These trucks conveyed the earth to the shaft whence it was taken in lifts to barges on the Thames. There is a possibility of this line being opened within the next few months, when we shall have something further to say about the electrical part of the undertaking.

Of the Central London line, which is a similar, but much larger affair, we have given various details from time to time. The tunneling and the construction of the various stations is being pushed forward by the Electric Traction Co., contractors for the whole of this portion of the works. The electrical equipment of the line is in the hands of the General Electric Co., whose London representatives, the British Thomson-Houston Co., will hand the road over to the Central London Railway Company complete and ready for running. When that may be it is not yet possible to say.

These are the only lines which have reached the prac

tical stage, but there are about twice the number on paper waiting for parliamentary sanction, and if these ever come to pass underground London will be one complete network of electric railroad. In view of this fact a very timely and reasonable proposition has been put forward by the Chairman of the City & South London line, Mr. C. G. Mott. That gentleman proposes that the authorities—when the schemes are under consideration—make certain stipulations to the promoters, requiring them to take their lines to such points that connection by subways or otherwise can be easily established between the entirety of the lines, thus making one complete service, so that passengers could travel from any part of London to any other part provided by the several systems without coming to the surface. This would be a great convenience from the passenger's point of view and would relieve the present very congested state of the traffic in London thoroughfares. It also seems that such an arrangement would add to the success of each of the railroads interested.

An electric underground line is now proposed from Charing Cross to Paddington, and application for a private bill has been deposited. The capital outlay is estimated at about $7,500,000 to $10,000,000. Another line, on paper, is the New Cross & Waterloo line, between three and four miles long, with a capital outlay of somewhere about a million dollars. Yet another scheme is for a line from Brixton to the city, another from Earl's Court to the city, another between Bow and Whitechapel, and there are others. But as they are all still in the preliminary stages, it is not worth saying much at present respecting them.

It is very probable that within a short time some announcement may be made respecting the electrical equipment of the Metropolitan and the Metropolitan District systems (the great "underground" lines). Some months ago a Parliamentary commission made a full inquiry into the subject, and tried to conceive some reasonable way in which the bad ventilation of the line could be overcome. They made various recommendations, but stated distinctly and emphatically that the only remedy lay in the employment of electricity instead of steam. The company's officials made the report that they had again and again gone into the matter, and fully agreed that if electricity could only be satisfactorily applied to the line, they would unhesitatingly adopt it. They stated the difficulties that lay in the way, and said they would be willing to consider any practicable scheme that might be brought forward by electrical engineers. It is now stated that an American electrical engineering firm has come forward with a scheme, which they declare will meet every requirement, but the nature of the proposals is of course not made public at the present stage, whether it will come to anything or not remains to be seen.

However the Commission's report, to which we refer, as good as stated that unless the present system gives way to electricity within three years, or the existing nuisance is abated by that time in some other way, the line will have to be closed up altogether.

The Discriminating Import Duty on Freight Coming Through Canada.

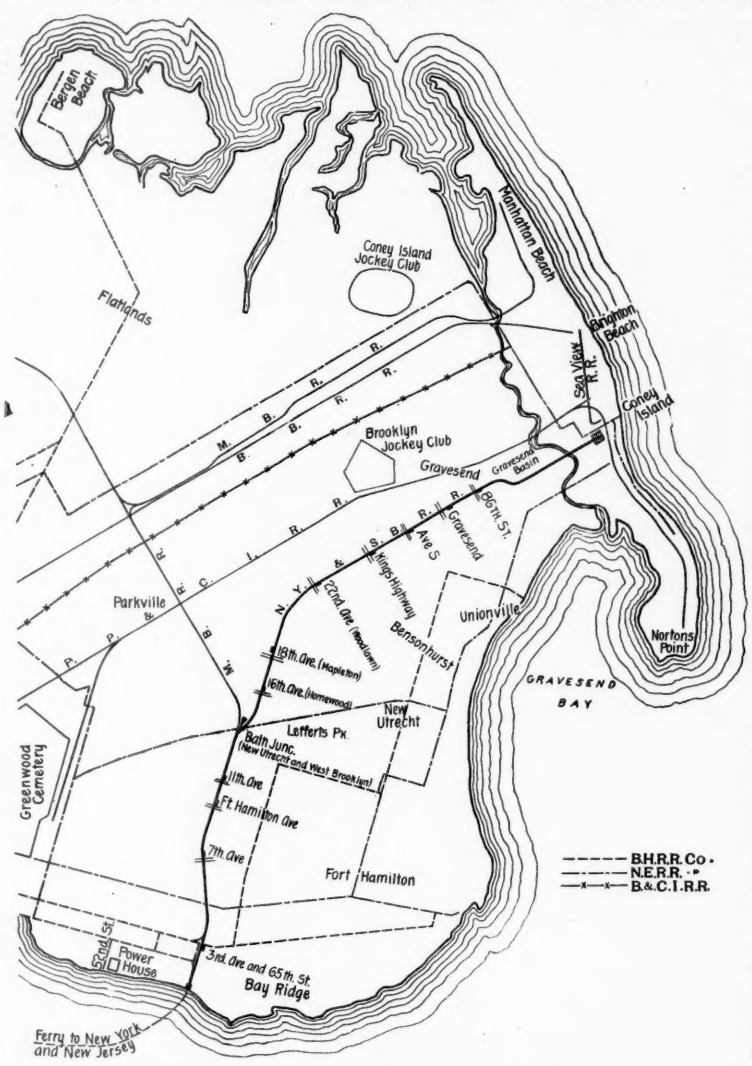
The famous Section 22 of the present United States tariff law appears to have been finally stripped of all its terrors, the Customs Board of Classification having decided in favor of the importers in the cases of several protests made at New York. It will be remembered that this section, which was smuggled into the tariff act in such a way that every member of Congress professed ignorance of its purpose and meaning, imposed a discriminating duty of 10 per cent. on goods imported through Canada or Mexico from a third country. At the same time it produced confusion in the previously existing laws concerning the imposition of a discriminating duty on goods coming to this country in the ships of foreign nations with which this country has made special treaties. Section 22 was clear in its language, but Attorney General McKenna succeeded in fixing up some sort of a construction which permitted Chinese and Japanese goods to continue to come into this country over the Canadian Pacific, and now the Customs Board decides virtually in the same way. Protests were made by importers at various cities. The Board of Classification of the United States General Appraisers is, in fact, the customs court for the entire nation. It consists of Judge H. M. Somerville, Chairman and late Associate Justice of the Alabama Supreme Court; Charles H. Ham, of Chicago, and George C. Tichenor, of Iowa. The opinion is the work of Judge Somerville. It reviews the history and intent of kindred legislation for the past century, and shows by the statements of the Chairmen of the respective Congressional committees having the Tariff bill in charge that Congress intended to make no substantial change from its past policy regarding foreign shipping. The changes actually made were designed, the Board thinks, to prevent evasions of the law by vessels of nations which might at any time refuse to admit our vessels to their ports on the same terms as their own. The Board admits the difficulty of construing the section, but holds that, by a well-known rule, the benefit of any doubt in the construction of a taxing statute should be given to the one taxed rather than to the government laying the tax. It is not likely that the Secretary of the Treasury will appeal from the Board's decision.

Electricity on the New York & Sea Beach Railroad.

The New York & Sea Beach Railroad, extending from the foot of Sixty-fifth street (Bay Ridge), Brooklyn, N. Y., to Coney Island, a distance of six miles, recently passed into the control of the Brooklyn Heights Railroad Co., which has changed the motive power from steam to electricity.

The object of the Brooklyn Heights road in acquiring this property was to furnish a high-class and frequent service to Coney Island from all parts of Brooklyn for a single five-cent fare. The overhead trolley was used, and the rails were bonded with the Horseshoe bond. No change in the roadbed was required.

Connections have been made with the tracks of the Brooklyn Heights road at Sixty-fifth street and Third avenue, to provide for through service from Fulton Ferry, the Bridge, Hamilton Ferry and South Ferry. Passengers coming from other parts of Brooklyn can reach Coney Island by transfer at Third avenue and Sixty-fifth street, or from other Brooklyn Heights lines at City Hall. The regular ferry line from the foot of Whitehall street, New York, to Bay Ridge will be run as usual and excursion steamers will also carry passengers on certain days from Elizabeth, Newark and Jersey City, and other points in New Jersey, in connection with the electric lines in or near those cities.



New York & Sea Beach Railroad and Other Lines to Coney Island.

A number of large cars have been ordered and between Bay Ridge and Coney Island one of these heavy motor cars will be used to haul two trailers. Motive power will be obtained from the South Brooklyn plant of the Brooklyn Heights road at the foot of Fifty-second street.

There are now two other electric roads running from Brooklyn to Coney Island, but the distance by the New York & Sea Beach will, as can be seen from the map, be much shorter and the service will be much better. Since the Brooklyn Heights road has been placed under the control of its present officers, the equipment, roadbed and service has been revolutionized, with the result that it can be looked upon as a model road in every respect. The improvements are now bringing returns in the form of steadily increasing earnings.

The Convention of the Manufacturers' Association.

The third annual convention of the National Association of Manufacturers of the United States was held in New York last week, Tuesday, Wednesday and Thursday. The attendance was large, and the convention, was, perhaps, in point of popularity and dignity, the most important that the Association has ever held.

On Tuesday morning the President, Mr. Theodore C. Search, read his annual report, after which the Association visited the steamer St. Louis of the American Line, where luncheon was served and speeches were made. An afternoon session was then held, at which the reports of officers and committees were presented, and in the evening a "smoker" was provided for the entertainment of the members and guests at the Waldorf-Astoria Hotel.

In President Search's report he reviewed the export field, giving comparative statistics of exports from the United States in various years, going back to 1821.

He next took up the shipping question and made an argument in favor of mail subsidies and naval subventions as aids in establishing commercial lines of shipping, saying that subventions, when they can be judiciously granted, should not be withheld.

He considered the subject of the Nicaragua Canal, urging the importance of taking this up and completing it, saying that "in assisting in such a work the government of the United States can only benefit and never can harm the people of other nations."

He made an argument in favor of the establishment of a goverment department of commerce and industry, saying that Congress is confidently looked to for legislation regarding this subject.

The subject of reciprocity was next considered, President Search saying "we cannot expect to get concessions which will prove of worth to us unless we are willing to give something in return, and a reciprocity giving little and taking much would find scant favor with other governments. We must go at least half way." The subjects of sample warehouses in foreign countries, of technical education, reforms in the consular service, international banking, national bankruptcy law, state taxation of foreign corporations, untaxed alcohol for the arts, patents and patent laws and the metric system all had brief consideration in the President's report.

The Committee on Transportation recommended a Memorial to Congress in support of amendments to the Interstate Commerce law as follows: In favor of a provision for uniform national classification; in favor of giving the Commission increased power to regulate the transactions of carriers; repeal of the fifth clause and the adoption of such amendments as will permit carriers to enter into agreements under the control and regulation of the committee; the adoption of the bill known as the anti-scalper's bill.

The committee further submitted a resolution to the effect that the Association recognize as a prime condition in the prosperity of our industries a reliable, efficient and economic system of transportation to foreign countries and recommends the establishment of American lines of steamships and a liberal system of contracts for the transportation of mail or such other subvention as may be necessary.

The Committee on Commerce and Industry made recommendations, the sum of which is that the Association should co-operate with everybody in the country working in behalf of creating a department of commerce and industry.

The Committee on Language, Weights and Measures submitted a report urging the adoption of the metric system on the ground that it would greatly facilitate foreign trade. It is recommended that the metric system of weights and measures should be made the legal system, and that this change should take place Jan. 1, 1901. All of the reports of committees were approved except this last one, which was referred to the Committee on Resolutions.

At the session of Wednesday, the Committee on Resolutions made a report with regard to the protection of American trademarks, which was adopted. By this report the Association invites the attention of the President and of Congress to this subject with the view of inducing all countries to enact laws prohibiting the importation and sale of goods not branded with the country of origin similar to those now in force in this country and in the United Kingdom. The committee also presented a resolution, which was adopted, recommending the establishment of an international American bank. It was also resolved that a committee of five be appointed to wait upon President McKinley and upon the Director of the Bureau of American Republics and offer hearty co-operation in furtherance of the proper reception and entertainment of the international delegates to the Pan American Congress to be held in Washington in 1900.

This committee was opposed to making the metric system of weights and measures compulsory and withheld its endorsement of the proposition made by the special committee, and it was voted that a committee of 15 be appointed to investigate the subject and report next year.

On Thursday the Committee on Resolutions reported further resolutions, among them one on the question of state taxation of foreign corporations, which was adopted to the effect that a committee of five be appointed to communicate with and co-operate with other associations that were considering this subject in order that joint action may be secured looking toward the repeal of inequitable or unjust provisions of state laws with regard to foreign corporations.

The convention favored increasing the facilities of the United States Patent Office by endorsing bills now before Congress for that purpose, and also recommended an active interest in the Paris Exposition of 1900.

The following officers were elected:

President, Theodore C. Search, Philadelphia; *Treasurer*, Charles A. Schieren, New York; *Secretary*, E. P. Wilson, Cincinnati; *Vice Presidents*, Alabama, C. F. Pratt; California, J. G. Hamilton; Connecticut, Pliny Jewell; Delaware, C. W. Pusey; Georgia, J. F. Hanson; Illinois, C. F. Quincy; Indiana, D. M. Parry; Kansas, Thomas Ryan; Kentucky, W. C. Nones; Louisiana, John Dymond; Maine, Charles R. Milliken; Maryland, David L. Bartlett; Massachusetts, Wm. C. Lovering; Mississippi, W. P. Adams; Michigan, George H. Barbour; Missouri, L. D. Kingsland; New Jersey, Benjamin Atha; New York, Charles A. Moore; North Carolina, D. A. Tompkins; Ohio, John H. Patterson; Oregon, L. D. Cole; Pennsylvania, John H. Converse; Rhode Island, Samuel M. Nicholson; South Carolina, Ellison A. Smyth; Tennessee, C. D. Mitchell; Vermont, Henry Fairbanks; West Virginia, N. E. Whitaker; Wisconsin, F. W. Sevier.

The convention closed with a brilliant banquet at the Waldorf-Astoria, at which President McKinley made a speech which has excited much attention and commendation, inasmuch as he expressed with definiteness the feeling of the administration in favor of maintaining our currency on a gold basis.

Merchants' Freight Bureaus.

It appears that there are now no less than 33 cities in the United States in which the merchants and shippers have an organization more or less definitely designed for dealing with the railroads. A list of these bureaus or departments has been made up by Mr. W. P. Trickett, of Kansas City, Secretary of the National Association of Freight Commissioners, and it appears in the table given herewith. The essential peculiarity of a freight bureau is the Commissionership, an office to be held by a man thoroughly acquainted with all transportation questions. The ideal Commissioner is one who has had considerable experience in actual railroad business and who gives his whole time to this work. We have indicated by an asterisk all which we understand to be of this character.

Baltimore, Md	Produce Exchange	W. S. Young, Commissioner.
Boston, Mass	Chamber of Commerce	D. W. Ranlett, Commissioner.
Charleston, S. C	Bureau of Freight	J. A. Smith, Manager.
*Chicago, Ill	Freight Bureau	N. C. Iglehart, Commissioner.
*Cincinnati, O	Freight Bureau	E. P. Wilson, Commissioner.
Cleveland, O	Transportation Board Chamber of Commerce	F. A. Scott Secretary.
*Dallas, Tex	Freight Bureau	James Farley, Commissioner.
*Denver, Col	Freight Bureau	J. F. Gallbraith, Chairman.
*Detroit, Mich	Freight Bureau	J. L. Moore, Commissioner.
*Galveston, Tex	Freight Bureau	J. B. Dennison, Commissioner.
Greensboro, N. C	Freight Association	R. C. Stannard, Manager
*Kansas City, Mo	Transportation Bureau	W. P. Trickett, Commissioner.
Little Rock, Ark	Board of Trade	J. A. Woodson, Commissioner.
Louisville, Ky	Transportation Com. Board of Trade	J. I. Tellford Secretary.
*Memphis, Tenn	Freight Bureau	James S Davant, Commissioner.
Milwaukee, Wis	Freight Bureau	Geo A. Schroeder, Commissioner.
Minneapolis Minn	Freight Bureau	J. H. Sullivan, Commissioner.
*Mobile, Ala	Freight Bureau	E. E. England, Manager.
Nashville, Tenn	Freight Bureau	A. Willis. Secretary.
New York, N. Y	American Export Association	F. B. Thurber, President.
Omaha, Neb	Commercial Club	J. E. Utt. Commissioner.
*Philadelphia, Pa	Trades' League	N. B. Kelly, Commissioner.
Pittsburgh, Pa	Chamber of Commerce	R. H Thompson Assist. Superintendent.
*Quincy, Ill	Freight Bureau	L. M. Boswell, Commissioner.
Richmond, Va	Traffic Bureau	E. S. Goodman, Manager.
St. Joseph, Mo	Commercial Club	F. W Maxwell, Commissioner.
*St. Louis, Mo	Traffic Bureau	A. J. Vanlandingham, Commissioner.
St. Paul, Minn	Freight Bureau	J. H. Beck, Commissioner.
San Antonio, Tex	Freight Bureau	Jas. M. Steere, Manager.
San Francisco, Cal	Pac. Coast Hardware & Importers' Association	F. L. Brown, Secretary.
*Savannah, Ga	Board of Trade	D. G. Purse, Commissioner.
*Sioux City, Ia	Commercial Club	J. V. Mahoney, Commissioner.
Wichita, Kan	Freight Bureau	L. W. Griffith, Commissioner.

Maine Railroad Commissioners' Report.

The Railroad Commissioners of Maine, J. B. Peaks, Frederic Danforth and B. F. Chadbourne, have issued the 39th annual report of the Board. It is a volume of 650 pages, containing the full returns from each railroad company and street railroad, and 140 pages of reports of hearings, decisions, etc.

The length of railroad in the state June 30, 1897, was 1,723 miles, an increase of five miles over the preceding year. There are 145 miles of 2-ft. gage railroad in Maine. The length of street railroad in the state is 140 miles, an increase of 13 miles over 1896. The gross earnings of the street railroads for the year ending June 30 were $770,614, and the number of passengers carried by them was 13,961,986. No passengers were killed on the standard railroads of the state during the year; 25 passengers were injured; 20 employees and 13 other persons were killed and 70 employees and 53 other persons were injured. On the street railroads two persons were killed and nine injured. The report gives notes of the physical condition of all of the railroads, both steam and electric, and there are a number of full-page direct process cuts, from photographs, showing bridge abutments and other structures, and one showing a palatial private car of the Portland (street) Railroad Company.

The engravings are, indeed, a prominent feature of the report, and they include some specimens of scenery which must make the Rocky Mountains and Niagara Falls envious in the extreme. There is a high trestle of the Bangor & Aroostook, and a wild sea view taken at Cape Elizabeth. This latter, with a number of scenes in pleasure parks, finds a place in a railroad commission's report by reason of the light it is supposed to throw on the business of certain street railroads.

Tests on the Chicago Storage Battery Road.

It is assumed that the reader is somewhat familiar with the excellent engineering work which has been done at the power station of the Englewood & Chicago Electric Street Railway. In previous issues reference has been made to this road and to the success thus far attending the running of the storage battery cars. During last summer 20 cars were in successful operation, and when the winter schedule was begun, the General Manager determined to make a complete test of the entire plant, in order to determine where present defects could be remedied and where the plant could be bettered. These tests, which were made under the ordinary working conditions, do not represent what could be done under more perfect conditions, and some of the results are not as favorable as might be expected. When necessary changes have been made, much better results are expected. Principally three series of tests were made under the direction of Mr. George A. Damon, assisted by Prof. T. P. Gaylord and a corps of students from the Armour Institute. Through the courtesy of Mr. G. Herbert Condict and the *Western Electrician*, which publishes simultaneously the report of this test, we are enabled to show what has already been accomplished in this station.

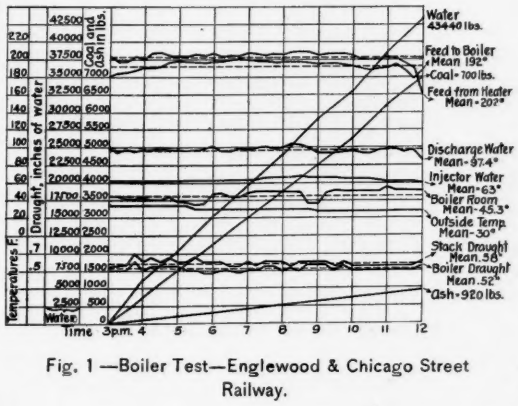


Fig. 1 —Boiler Test—Englewood & Chicago Street Railway.

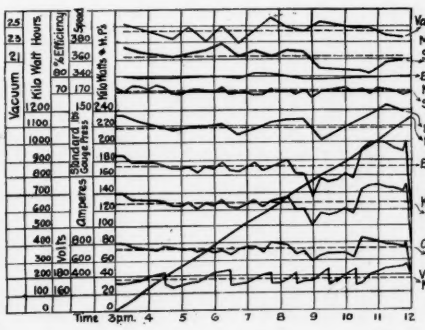


Fig. 2 —Engine and Generator Tests.

The boiler plant includes three Heine water-tube boilers rated at 200 boiler horse power each, fitted with Roney mechanical stokers. The engines are triple-expansion, condensing, of the Willans central-valve type made by the M. C. Bullock Mfg. Co. of Chicago. The plant at present contains two of these engines, each of which has two lines of tandem cylinders rated at 200 H. P. at a speed of 380 revolutions per minute.

The engines are directly connected by the "Arnold" method to four six-pole, shunt-wound Walker generators, rated at 190 K. W, each when runningat 380 revolutions a minute. In the system used to connect the generators each dynamo armature is carried on a hollow quill, through which extends a solid shaft with suitable mechanical connections so arranged at present that either engine can operate any number of the four generators which are designed to deliver their rated output at a voltage varying between 160 and 190 volts.

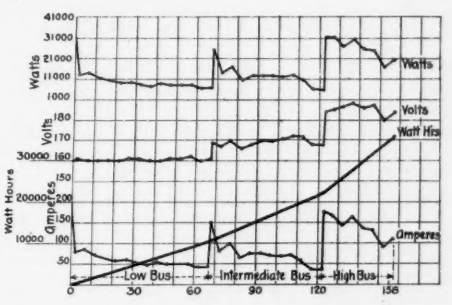


Fig. 3.—Charges of Storage Battery Cells.

Each engine exhausts into a Worthington jet condenser, from which the condensed steam and heated injection water is raised by means of the air pump about 35 ft. to the top of a Worthington cooling tower, in the bottom of which it collects ready to be again used in the condenser. The blast of air which evaporates a small part of the water, and thus cools that remaining in the tower, is furnished by a fan operated by a Siemens & Halske motor. The water lost by evaporation and otherwise is replaced from either the city mains or an artesian well, the latter fitted with a direct plunger type pump.

The boiler-feed pumps are of the Worthington duplex-compound type, and ordinarily take their supply from the well of the cooling tower, pumping it through a closed feed-water heater in the exhaust line of the pumps and thence through the economizer to a common feed-water heater above the boilers.

The hot flue gases from the boilers pass from the uptakes into a brick smoke flue extending the entire length of the boiler room. In a brickwork extension of this flue, located between the power house proper and the stack, is installed a Green economizer with passages and dampers so arranged that the economizer pipes may be made to intercept the hot flue gases. The economizer is made up of eight rows of 24 pipes each, making a total of 192 pipes. The steel stack is self-supporting, is 150 ft. high and 7 ft. in diameter.

The tests to which we shall particularly refer were made on Nov. 26 last, and Fig. 1 shows graphically the results of the boiler test on that day, while Fig. 2 gives the data obtained from tests on the engines and generators at the same time. These tests were run with one boiler, one engine and two generators, but the three-voltage method of charging the batteries, which was followed in the previous tests, was here discarded. The coal used was delivered at the power house for $1.90 per ton and an average of five determinations of its calorific value gave 10,145 B. T. U. per pound. The fixed carbon in this coal was 48 per cent., volatiles and combustible 33 per cent., moisture 6 per cent., sulphur 3 per cent. and ash 10 per cent. These percentages are given in round numbers. Cards were taken every half hour during the test. These showed an average I. H. P. of 2 7 and average E. H. P. of 172 and an average all-day efficiency of 79.3. The coal had a theoretical evaporative power of 10,145 ÷ 965 7 = 10.5 lbs. of water per pound The evaporation from and at 212 deg. actually obtained per pound of dry coal was 6.6. Therefore, the efficiency of the boiler and furnace is found to be 62 86 per cent. This efficiency was obtained when the boiler was 26 per cent. underloaded, which accounts in part for the low figure. The equivalent evaporation per pound of combustible was 8 22, so that the efficiency of the boiler alone was 78.3 per cent., and the boiler loses by radiation and other causes 21.7 per cent., while the furnace is to be charged with 14.44 per cent. of the lost heat, and the remainder 62.86 per cent. appears in the steam.

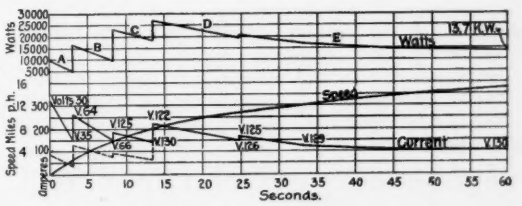


Fig 4 —Average of Five Acceleration Tests.

The test shows that the engines used 18 lbs. of steam per I. H. P., but it should be remembered that among

(*Continued on page 82.*)

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The fast trains of the Pennsylvania between Cleveland and Pittsburgh, Numbers 10 and 11, are now equipped with the high speed brake. These trains run through, 140 miles, in 3½ hours, or at the rate of 40 miles an hour, and from Alliance to Newburgh, 49 miles, in 67 minutes. As this part of the line is single track, and as stops are made at two places to let off passengers whenever required, the speed on the open road must be high. This is the fourth application of the high speed apparatus in regular service, the other three being the Empire State Express of the New York Central, the Congressional Limited of the Pennsylvania between Jersey City and Washington and the Black Diamond Express of the Lehigh Valley. In view of the simplicity of this apparatus we may expect, now that more trains will be fitted with it. The two obstacles that would have been encountered a few years ago, the necessity of equipping a considerable number of engines for a single train and the inconvenience of frequently attaching extra cars to trains which are intended to be strictly limited, are now so reduced that the increased safety that may be secured by this additional stopping power is available in a considerable number of cases. In other words, the number of trains now running which are (1) hauled long distances by the same engine, (2) are made up always of the same cars and (3) are run at high speed, is sufficient to create a considerable field of usefulness of the high speed brake. The apparatus was described in the *Railroad Gazette* of June 25, 1897. The additional brake power is due to the use of air at 110 lbs. pressure instead of 70 lbs., as in ordinary service, and the only extra apparatus on the cars is a relief valve by which the brake cylinder is relieved of the extra pressure before the speed of the train has been so reduced as to permit sliding the wheels.

For some days speculators and investors in the markets and financial writers in the daily newspapers have been greatly occupied with stories of a purchase by the New York Central of all the securities of the Lake Shore, thus actually consolidating the ownership of those two properties, as their interests have been largely consolidated for a long time. Naturally the speculations as to the final development of the consolidation grow in magnitude from day to day, as men's imagination has time to play around the subject, until finally the consolidated system includes the New York Central and all the allied roads in the state of New York, the Lake Shore, the Michigan Central, the Chicago & Northwestern, the "Omaha," the Union Pacific, the "Big Four," the Chesapeake & Ohio and perhaps others. To begin with, we may as well acknowledge at once that we know almost nothing as to the plans of the gentlemen controlling these properties and controlling the present operation, assuming that there is an operation of this sort going on. We may add that no one else outside the small circle in control of affairs does know. In the nature of things knowledge of this sort cannot be allowed to come to the possession of outsiders. Such knowledge means money and a good deal of money, and, like other commodities which mean money, it is not lying around to be picked up by everyone who walks the streets. We can only speak of the probability, and here we need only say that consolidation of railroad properties, absolute and final consolidation, is the theory of salvation on which Mr. Morgan and the Vanderbilts, who really control this situation entirely, have long worked and the theory which Mr. Morgan has repeatedly promulgated. We can say further that nothing could be more natural and logical than the consolidation of the ownership of the New York Central, the Lake Shore, the Michigan Central and other properties so closely allied. But transactions of such colossal magnitude are not easy to carry out; if they were every man would perform them and every one would become rich. It follows then that the grand, ultimate consolidation of these properties may be long delayed, but it looks as if the beginning was near at hand.

Rapid Transit in New York.

On Monday of this week the President of the Manhattan Railway Company addressed to the Rapid Transit Commissioners a communication setting forth somewhat definitely the privileges which the company asks in the way of extending and improving its railroad system within the city.

It is proposed to leave the line at or near the present downtown terminus, with a new line running north through West street, thus tapping the ferries along that street, and finally, having passed the region of dense ferry travel, turning eastward and joining the West Side lines in Ninth avenue and Sixth avenue. Such a line would be of great convenience to a large number of people doing business in New York and living in New Jersey, and to members of their families who come in and out for shopping, and also to a considerable number of through passengers to and from the various railroads having termini west of the Hudson River. Furthermore, it is a mistake to say positively that this new line would not relieve the crowded condition of the existing west side lines. A number of people who have business in the quarter between Broadway and the Hudson River would go to the trains of this line instead of to the trains of the Ninth avenue and Sixth avenue lines, thus relieving those trains in the lower part of their transit; and if the further privileges asked for by the President of the Manhattan are granted and the further improvements suggested are carried out, there will be facilities to handle more frequent trains on those portions of the west side lines above the junction of the proposed West street tracks. In other words, the West street tracks would give facilities for dispatching more trains, and with additional tracks on the structures further north more trains could be handled.

Another proposition is a crosstown line from the Brooklyn Bridge terminus to intersect the uptown lines and to go as far across as the new West street line. This, again, would be a useful addition to the system, in that it would accommodate people traveling between Brooklyn and New Jersey, not a very large number, to be sure, and it would accommodate people wishing to travel between Brooklyn and the west side—as, for instance, shoppers and theater goers—a large number. It is not easy to see how it would relieve the crowds.

Another request is for the right to lay additional tracks on the existing structures, or above or beneath them, and the West street franchise, which is specifically for two tracks, is to contain a proviso that additional tracks may be put down. All of this is important. If each of the existing structures could be provided with a continuous third track the present situation would be immediately and greatly relieved. Frequent express trains could be run down in the morning and up in the evening on that third track, which would not, it is true, double the capacity of the present tracks, but would add greatly to that capacity.

Another proposition is for the right to extend the lines to the city limits on the west and the east sides. Whether or not this right should be granted is, we suppose, merely a matter of agreement upon routes. Nobody can question the desirability of giving this privilege. For years it has been the obvious policy of the Manhattan not to make such extensions if they could be avoided, for the business reason that fixed charges and working expenses would be increased much more rapidly than earnings. If the company has now concluded that it is wise and politic to make these extensions it would seem wise and politic to encourage them. We cannot conceive, however, that the Manhattan would be allowed to destroy the beauty of the Boulevard by a structure up the middle of that noble street.

Another request is for the privilege to enlarge the platforms at the City Hall station. This would be a public convenience, but we judge that to make the scheme complete the company should also have the privilege to lengthen platforms at all way stations and to provide larger yard and switching facilities at the termini.

Some of the newspapers look upon it as ominous that Mr. Gould says nothing in this communication about electrical equipment. That is another branch of the subject, and electrical equipment is not *necessary* to greatly increase the efficiency to the system. As many passengers can be carried by steam as by electricity, and they can be carried as quickly. It is for the Manhattan Company and its engineers to ascertain by laborious and thorough computation which motive power will, considering all things, be most economical and satisfactory. On the structures *as they are*, longer trains can be hauled and better time can be made with electric motors than with steam motors because the adhesion weight can be distributed over more wheels: consequently, more tractive power can be used without overloading the structure. Consequently, heavier trains can be hauled, and these trains can be brought up to speed quicker on starting from the station. But to handle longer trains there must be longer platforms at all the stations. If the Manhattan Company despatched seven-car trains instead of five-car trains, at the same speed and the same intervals run by the five-car trains now in service, they would immediately add 40 per cent. to the car capacity. Very likely there would be no trouble in running seven-car trains on the present structures if electric motors were used. That is a question for the study of the civil engineer expert in bridge structures to settle, and his advice can be had for a proper fee. If volunteered, it will probably be worth no more than it costs.

It may be, however, that the Manhattan Company will decide, after the thorough study of all the conditions which it must make, that the sum of the advantages is still on the side of steam motors. The company may decide that, taking into consideration all the factors, it would be cheaper to strengthen the structure and run heavier steam motors than to equip with electricity. If the company should decide to give greater facilities in that way the only point remaining for the public to worry about is the greater cleanliness of the electric motors. The steam motors do blow out more or less unburned coal, especially in starting up from the stations, but the annoyance from this is comparatively a trivial matter. It might be reasonable to ask the Manhattan Company to spend, say, $250,000 for cleaner motors; but it would not be reasonable to ask it to spend $7,000,000. It would be bad public policy; it would be a waste of human energy as stored up in accumulated capital.

In truth, this question of electrical equipment is a part of the whole broad question of the way to make a dollar invested produce most for the company and the public. We shall not pretend to analyze it or answer it for a less fee than about $5,000. A sound opinion, based on accurate detailed knowledge, would be worth that at least.

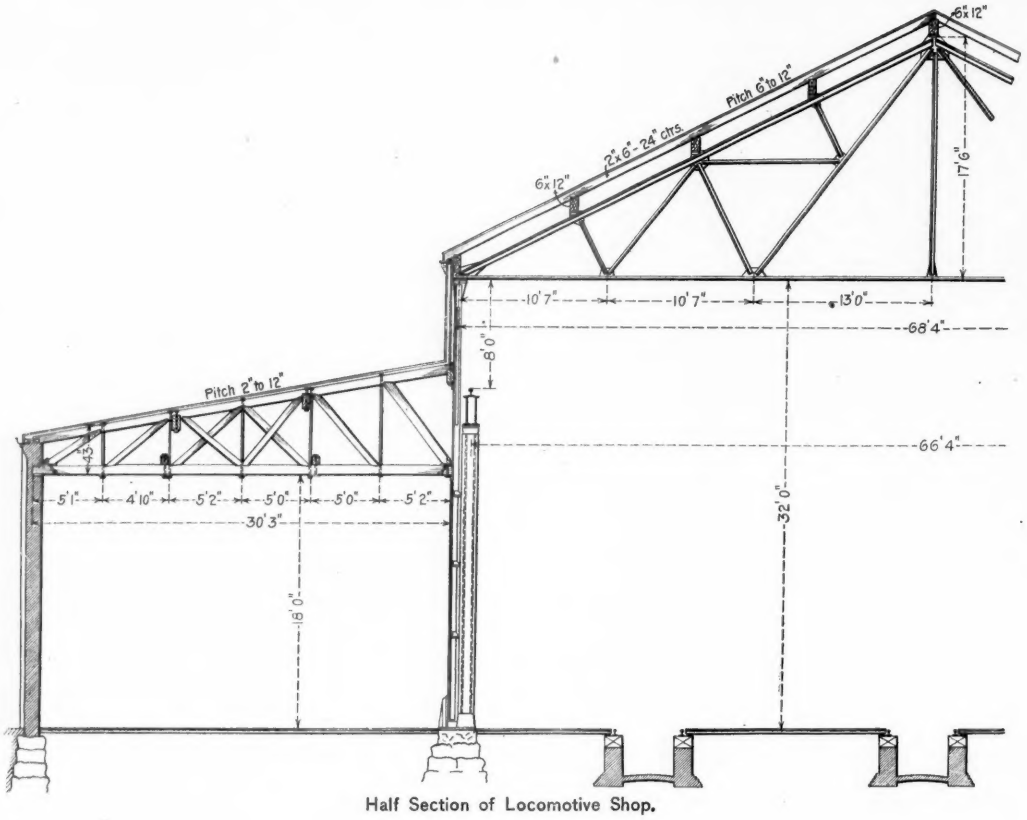
We discover in the newspapers some traces of suspicion of the good faith of the Manhattan officers in the propositions now made, which suspicion serves no good end. The truth will be soonest developed by zealous co-operation on the part of the Commissioners and the press in pushing the scheme along. We judge that the Manhattan Company is in earnest in the matter, and there are important reasons why it should be prompt and diligent in carrying out the plan. A possible suggestion of policy is the recent appointment of an engineer of large and varied experience in bridge and railroad work as consulting engineer. That may or may not mean business.

Reversing Locomotives.

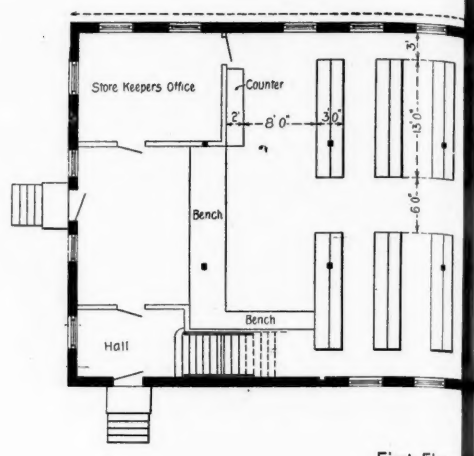
In considering the question whether or not it is best to reverse the locomotive when we wish to make a quick stop it should be divided into two distinct parts.

The first matter to settle is whether a stop with the engine reversed will be quicker or slower, and whether the retarding effect is more or less reliable. This phase of the question concerns railroad men, stockholders and the general public.

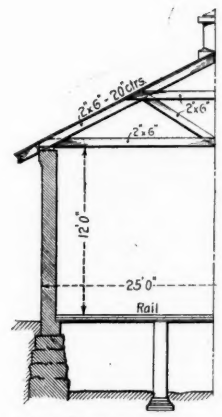
The second matter is the effect of reversing on the engine. This concerns railroad officers and stockholders alone. At least, it concerns the public only



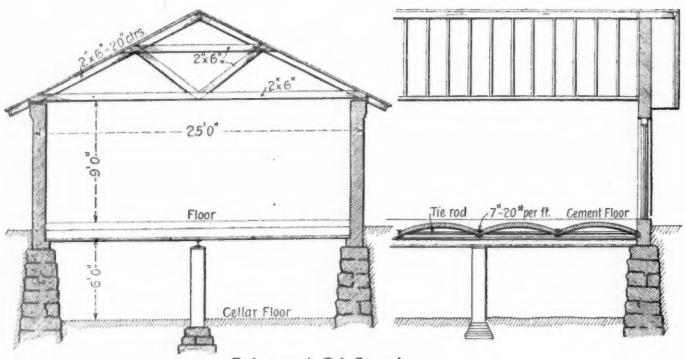
Half Section of Locomotive Shop.



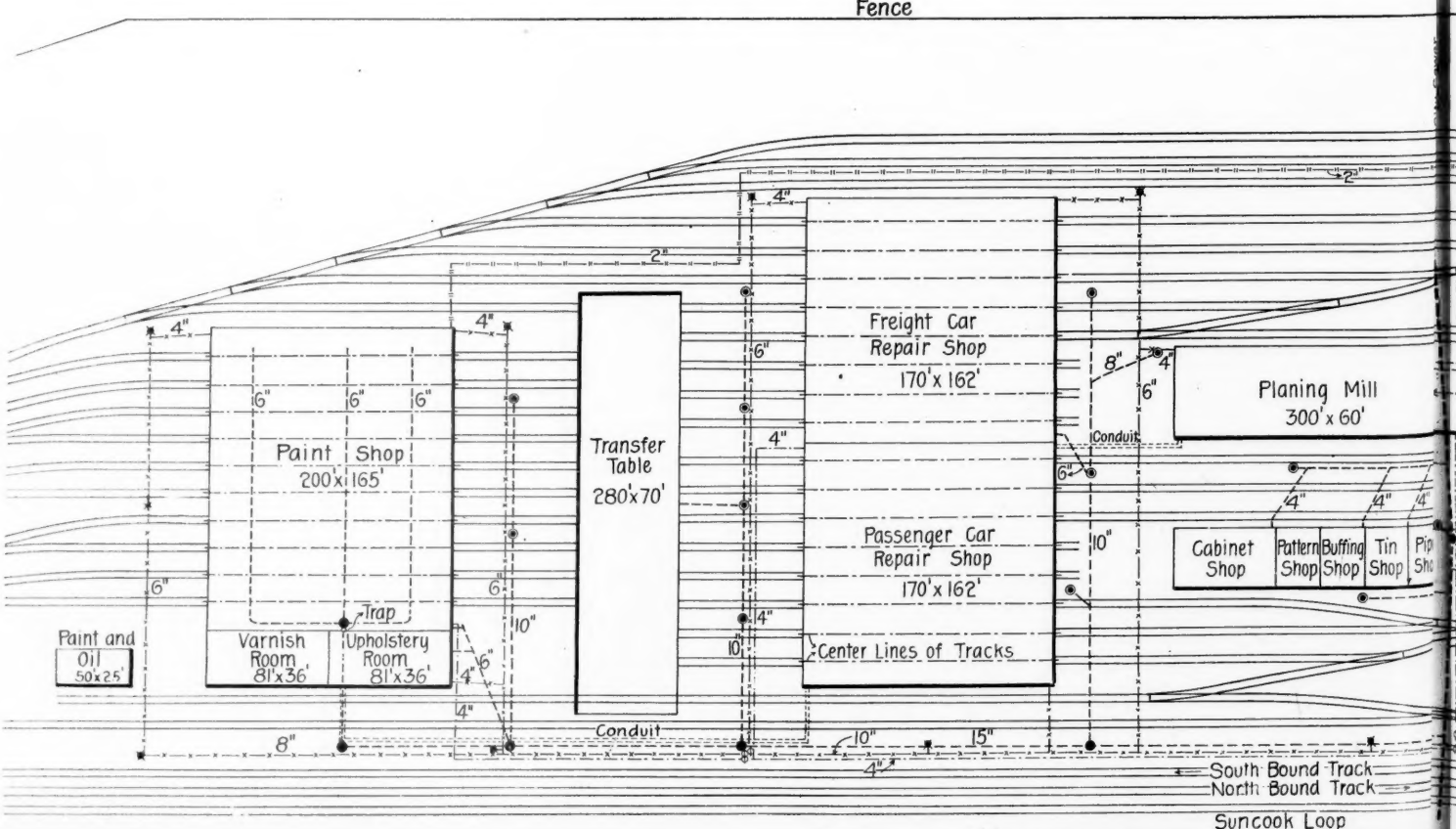
First Floor of Storeh



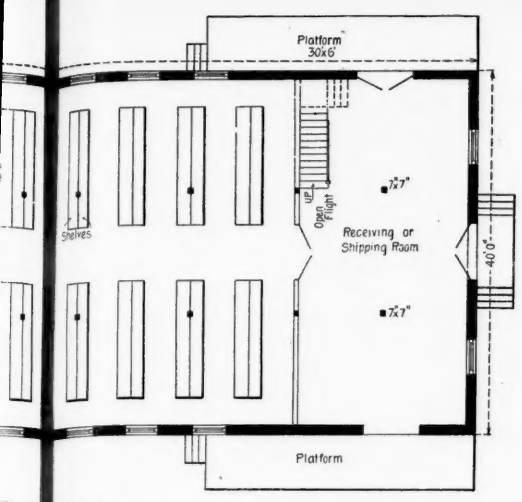
Half Section of Dry House.



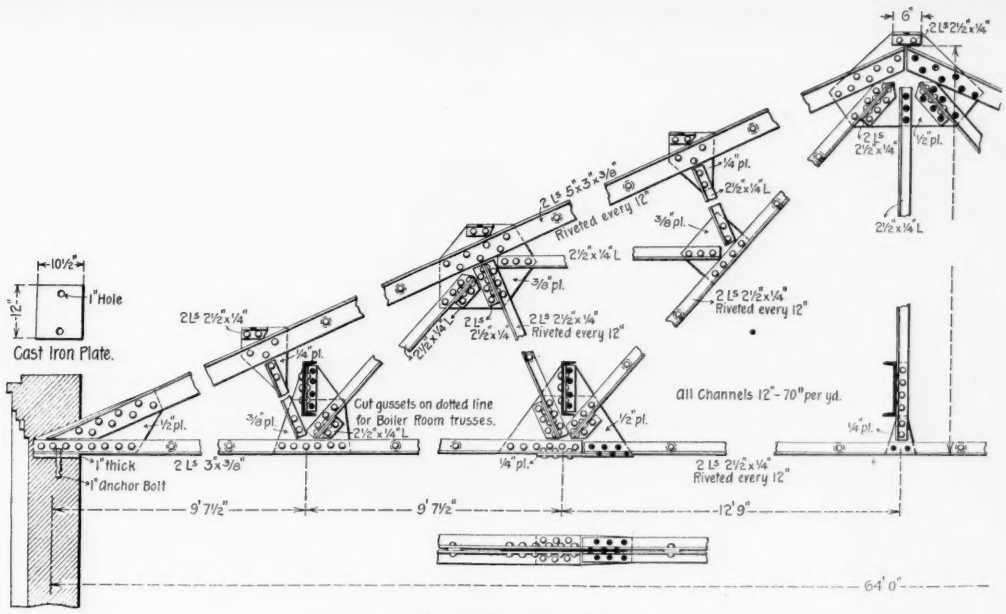
Paint and Oil Storehouse.



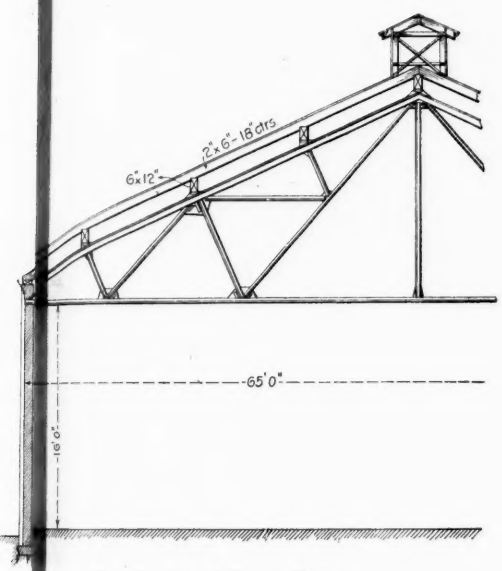
NEW LOCOMOTIVE AND CAR SHOPS, BOSTON & MAINE RA



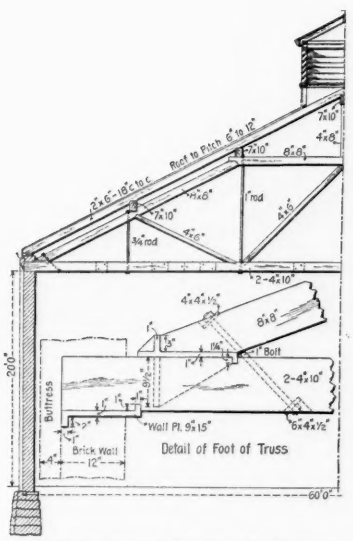
Floor of Storehouse.



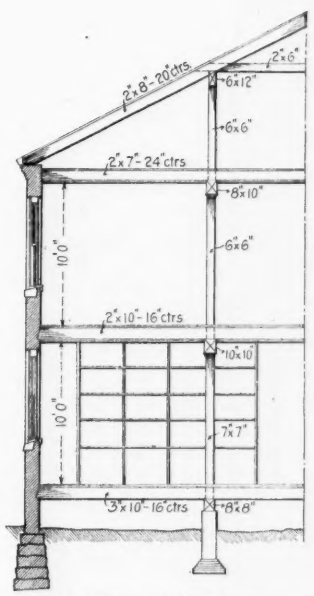
Roof Truss of Power House.



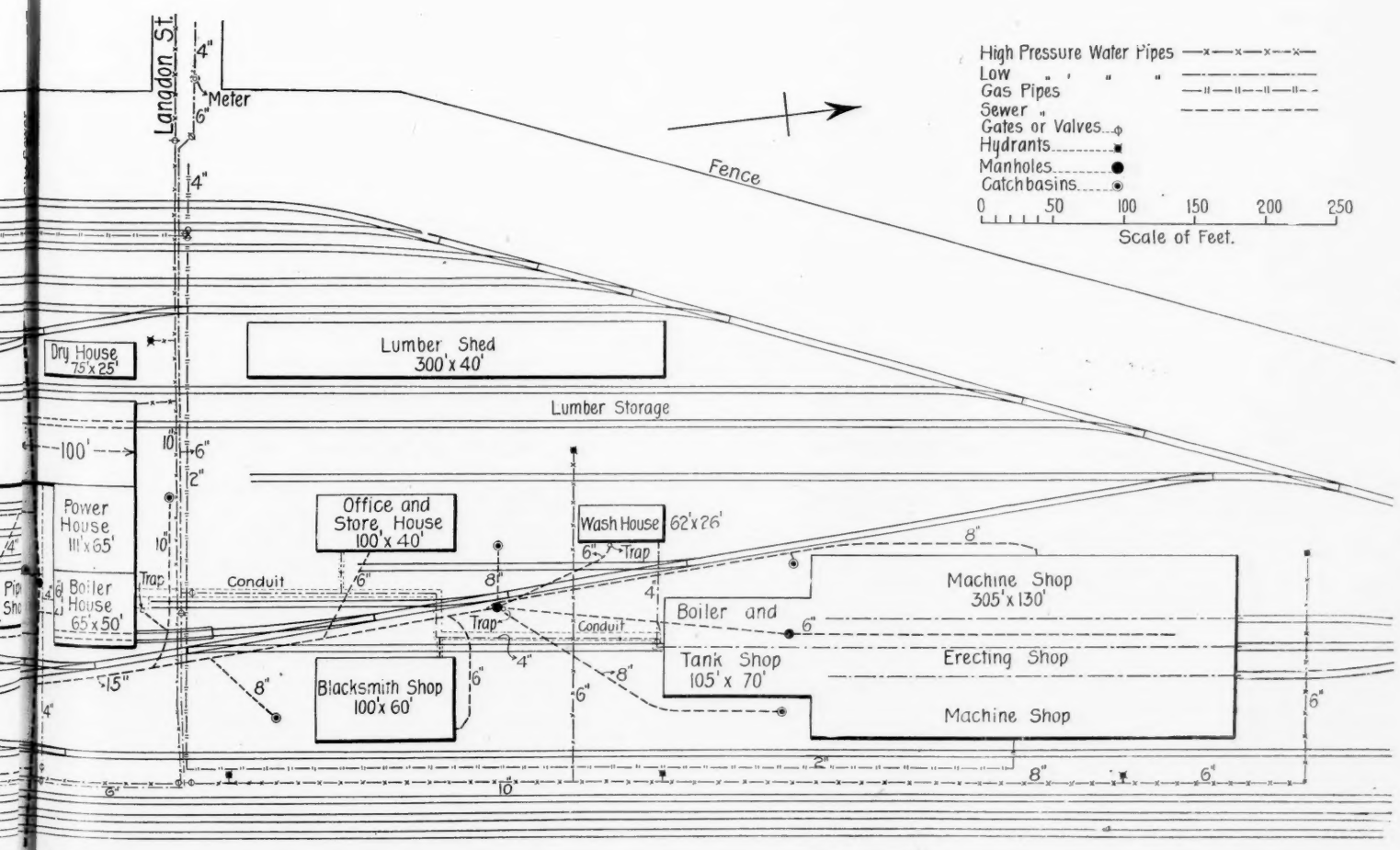
Half Section of Power House.



Half Section of Blacksmith Shop.



Half Section of Storehouse.



TO MAINE RAILROAD, CONCORD, NEW HAMPSHIRE.

indirectly, and as anything which affects the prosperity of the railroads affects the public.

At the outset we should say that a locomotive fitted with driver brakes up to good modern standard practice can be stopped quicker if it is not reversed. If the wheels are locked and begin to slide, or if they begin to turn backward much of the retarding value of the brakes is lost. This is recognized and is, we suppose, beyond discussion. It has become one of the elementary principles in braking.

Twenty years ago the famous Galton-Westinghouse experiments revealed and proved the principle which Sir Douglas Galton (then Captain Galton) stated thus: "To obtain the maximum retarding power on the train the wheels ought never to skid." It was shown by actual experiment that when the brake pressure was great enough to slide the wheels more time and more distance were consumed in the stop than when the applied brake pressure was less and the wheels did not slide. In the three remarkable papers which Captain Galton presented to the Institute of Civil Engineers in 1878 and 1879, recording the experiments made by him and Mr. George Westinghouse, Jr., this fundamental principle is stated again and again and its bearing on brake practice is developed. It is interesting now to read the discussion on these papers and see this principle dawning on the intelligence of the able and experienced gentlemen who looked at the diagrams and listened to the expositions of Galton and Westinghouse. It is like opening up ancient history, so familiar is the principle now to the most superficial student of the science and art of stopping trains.

If, therefore, reversing a locomotive is sure to slide the wheels or to turn them backward, or if it does this more than one-half the times that we reverse, we need go no further. The case against reversing is proved. But is reversing sure to do these things, or to do them more than one-half the time when we try it? Here we must consult opinion and recorded facts.

To get an idea of prevailing practice in the matter of emergency stops, we asked a number of motive power officers for their experience and views, and we are in receipt of some interesting letters, from which we conclude that reversing in emergency stops is generally followed by taking the engine into the shop and turning down the tires because of flat spots, the result of sliding. The superintendent of motive power of one of the biggest systems says "our practice is not to reverse the drivers in order to make a quick stop, but to apply the emergency brake. I think it is well recognized by the majority of the roads in this conntry that it would be bad practice to reverse an engine equipped with air brakes when such air brakes are in proper condition." The motive power men are not always quite so explicit as this, but the prevalent practice and opinion are against reversing.

In a letter to the *Railroad Gazette*, printed in our issue of Dec. 31, the writer quotes Forney and Sinclair as instructing the enginemen "to reverse the engine and open the throttle and the sand valves." This writer, however, obviously consulted some of the earlier editions of the manuals written by those gentlemen; those written at a time when the air brake was not universally used and when it was still imperfect. The instructions quoted refer to handling trains with hand brakes and the earlier and comparatively inefficient air brakes, and have been omitted from the late editions. We do not find in these later editions any statements which could be construed in favor of reversing, and conclude that both writers changed their views along with changes in conditions following the general introduction of an efficient air brake. We do find, however, statements which may mean that the air brakes should be used alone. For instance, Forney, in the last edition of the "Catechism of the Locomotive," says "in case of danger the handle of the engineer's valve should be turned to the emergency position," but he says nothing about reversing; and Sinclair, in answer to the question as to the probable result of reversing with driver brakes, says the effect would be to lock and slide the wheels, resulting in flat spots. In a letter printed in our issue of Jan. 21, Mr. Sinclair says, "With the efficient driver brakes now in use, I would say do not reverse the engine when the driver brake is applied."

Some interesting testimony appears in a letter to the *Railroad Gazette*, published Jan. 7. The writer cites three enginemen of the New York Central who were called as witnesses in a suit and emphatically stated that "they would never under any circumstances reverse their engines in order to bring the train to a stop. When they had to stop a train in the shortest possible distance they shut off the steam and applied the air and did nothing else. There was only one quicker way to stop a train and that was to run into something. They agreed that, upon reversing, the back pressure in the cylinders was so great as to lock the drivers and cause them to slide."

We get some important evidence on this subject from a report of tests made in 1895 on the Nashville, Chattanooga & St. Louis Railway and reported in the 1895 Proceedings of the Association of Railroad Air Brake Men, with comment by the Committee of the Association. Some very careful experiments were made under the direction of Mr. Thomas, Assistant General Manager of the road, to ascertain the relative length of stop, reversing and not reversing. The little table which follows gives the results of trials with engine and tender alone, each stop being made from 30 miles an hour, without sand. The braking power on the drivers was 70 per cent. of the load on them; on the tender it was 100 per cent. of the light weight of the tender, and the tests were made on a level track under generally favorable conditions. A considerable number of tests was made under each of the conditions reported and the results in the table show the average.

Means employed.	Average stop in feet.	Remarks.
Engine reversed; no brakes applied.	450	Wheels locked and revolved backward.
Engine plugged*; no brakes applied.	522	Wheels locked and revolved backward.
Tender brake alone applied.	538	No wheels slid.
Driver brake alone applied.	412	No wheels slid.
Driver and tender brakes both applied.	254	No wheels slid.
Driver and tender brakes applied and engine reversed.	276	Drivers slid, making flat spots 2⅛ in. long.

* "Engine plugged" means that the engine was reversed and the throttle opened.

The Committee publishes the following conclusions among others:

"The shortest reliable stops will be made by a retarding power which is most quickly developed and maintained to the higest possible limit during the entire stop, consistent with safety from skidding of wheels, such as the air brakes give. . . .

"The retarding power given by the back pressure in the steam cylinders when the engine is reversed fluctuates, and is too inconstant to be relied upon. As soon as the back pressure developed is greater than the adhesion between the wheel and the rail, the driving wheels will revolve backward and lose nearly all retarding force. Trials were made, throwing the reverse lever ahead a sufficient length of time to release the wheels and get them running forward again, but so much time and distance was lost in this effort that the stop exceeded in length that made by leaving the lever in the back motion after it had been placed there. The length of stop was the same whether the cylinder cocks were opened or closed. When the engine was reversed without brakes the wheels did not lock rigidly.

"The length of stop made with air brakes applied and engine reversed, while being longer and extremely injurious to the tire from skidding and making flat spots, is not as long as was expected, but is satisfactorily accounted for by the fact that the flat spot grew during the stop and, with the heat developed, gave a larger and better surface to the rail for adhesion. The stop was longer than those made with the brakes alone and was very costly. The results of these tests should determine the inadvisability of using the reverse lever in conjunction with air brakes."

Further than this the Committee adds that "in making the unexpected emergency stops the drivers would invariably lock when the engines were reversed and flat spots were had. In one instance the engineer, who was unusually expert and active, got tangled up in his reverse lever and did not succeed in reversing by his first effort. When considering the fact that a relative length of time is consumed by the engineer recovering from the bewilderment of unexpected emergencies it would seem impossible for him to get sand on the rail before the wheels would lock if he were to reverse his engine after applying the brake."

The Westinghouse Air Brake Company, in its printed instructions, says: "Do not reverse your engine when the driver brakes are applied. If properly designed they will give all the resistance to revolution the driving-wheels will comfortably bear. Retardation of movement is less with sliding wheels than when revolving with the brakes applied."

Summing up, then, we know that with wheels skidded or reversed in motion the stop will be longer in time and in distance than when they continue to revolve forward. We may conclude from the evidence presented above that when the engine is reversed the wheels will probably slide and the stop will be longer than with a good air-brake equipment properly used and no reversing.

But it may be argued that with good modern driver brakes there may be an advantage in reversing at the beginning of the stop under certain conditions as below: With the ordinary quick action brake there is no means of reducing brake pressure as speed falls. This is accomplished with the high speed brake now in use on a few of the best trains on four different railroads of the United States, but is not accomplished in any other regular practice. Everyone knows that the co-efficient of friction increases as the speed falls. Therefore we cannot use a brake pressure corresponding to the full weight on the drivers, or the wheels will slide when the speed is reduced to some point. It follows that a greater braking force may be used near the beginning of a stop, and under certain conditions this increased pressure might be obtained by reversing the engine during the early portion of the stop, and allowing it to so work until the speed had been considerably reduced when the reverse lever could be returned to the forward position. There are, however, several objections to this method, which were well brought out in the tests of the Air Brake Men's Association. The first objection is that when the back-pressure in the cylinders would be of the most use, namely, at the highest speed, the number of the revolutions of the drivers per minute is so great that an excessive pressure is immediately pumped up in the cylinders unless the engine is reversed without closing the throttle, and even then an excessive pressure is likely to be obtained. The back pressure also fluctuates greatly and cannot be regulated. Of more importance than all others is the fact that if a proper braking pressure is employed, the reversal of the engine with the brakes applied results in the skidding of the drivers even at high speeds. If skidding does not take place under these conditions, it is a sure sign that the driver brakes are not what they should be, and that a higher braking pressure can be safely used on the driving wheels.

So we conclude that from the point of stopping the locomotive should never be reversed, and on the second phase of the question the effect of reversing on the machinery there can be no doubt. We have seen them sliding the wheels, and consequently flat spots are almost inevitable.

But, further, where no provision is made for relieving the excessive pressure above the valve, the piston and valve rods, connecting rods and crank pins, and in fact all the moving parts, are subjected to greater stresses than ever occur in hauling or starting a train. Instances are given where steam chests have been blown to pieces, due to the excessive pressure developed in the cylinders on account of reversing; but this excess pressure can doubtless be controlled by the prompt opening of the throttle allowing the cylinder pressure to equalize with that in the boiler, which, in turn, will be governed by the safety valves. What the cylinder pressure may become when reversing with the throttle closed, is given in a general way by a test made on the Chicago Burlington & Quincy in 1887. A steam gage capable of registering 200 lbs. per square inch was placed on the steam chest, and in stopping from a speed of about 40 miles an hour, this gage burst quickly after the reverse lever was put in the back motion position, showing that the pressure was considerably more than 200 lbs. per square inch.

The consensus of opinion seems to be that American locomotives are so strongly constructed that the moving parts are not injured by reversing, if proper precautions are taken to guard against excessive pressure in the cylinders. But it is agreed that the hot gases and cinders drawn in from the smokebox and compressed in the cylinders are injurious to the packing, cylinders and valves on account of the dirt and grit thus introduced, and also that the high temperature of the gases tends to destroy the lubricating effect of the oil in the cylinders and steam chests

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Where enginemen and other trainmen work in a "chain gang"—each man, on beginning a trip, having his named placed at the bottom of the list, so that all the men on the list may have equal privileges in case of scarcity of work and equal responsibilities in case of scarcity of men—every large increase or decrease in traffic gives rise to dissatisfaction. If there is an increase the company is dissatisfied, because the men have to work too long hours, impairing their efficiency. The men should be equally dissatisfied, though their anxiety to increase their earnings may stifle any such feeling If there is a decrease the men are dissatisfied at the loss of income, and the company is reluctant to dismiss a part of the men, because it wants to have them quickly available when business next increases. We do not say that this dissatisfaction makes trouble; usually it does not for the chain gang plan has been deliberately chosen as the least of two evils, but there is generally some friction. Even what little friction arises from the jealousy of men receiving uniform pay, when they see enginemen drawing $175 a month, generally has to be noticed by the trainmaster. This subject has been called to mind by an item in a Western paper concerning the freight enginemen on a certain Chicago road. The item says:

"The heavy business of the past six months, and the policy of the company not to employ more men, com-

pelled the abolishment of the old rule limiting the monthly earnings, and the enginemen were enabled to earn from $175 to $220 a month and the firemen from $100 to $130. But the General Manager expressed himself as opposed to the overworking of the men and to the large checks paid, and orders were issued to employ more men, and to put in force the old limit as to mileage. This has now been done, commencing January 26, and all engineers who have earned $130 and firemen who have earned $70 will be pulled off until the first of next month. The extra men will now have a harvest."

The purpose in this matter appears to be highly commendable, but why make the men take their lay-off all at once for a whole month? We do not know the rates of pay on the road in question, and it cannot be said, from this item, that the men have worked without suitable intervals for rest; but if there is to be any advantage to the company from limiting the monthly pay of the men it should be in the matter of easier hours and more uniform rest; and giving five or six days rest in a lump is not the best way of accomplishing that object. The simple fact of "large checks" cannot be a very serious objection in the mind of the manager, and that part of the report must be mistaken. What the manager wants is men fresh from their work every trip, and if a man is to work five-sixths of the time, the natural arrangement would seem to be to have him lie off every sixth day or trip.

Much difficulty has been experienced in cold weather in keeping the Chicago cribs, which furnish the water supply of the city, free from ice, and a plan is now being tried at the Hyde Park crib which promises to be a solution of the problem in certain cases. This consists of enclosing the well at the crib so as to form a building in which is installed a low-pressure system of steam heating. The Hyde Park crib was thus enclosed and equipped last fall with a 30 H. P. tubular boiler and a direct system of steam heating. In the coldest weather of this winter it has been possible to keep the entire crib at a temperature of 70 deg. Fahr. with a pressure of 7 lbs. per square inch in the heating system, and there has so far been no trouble from ice at this crib since the new arrangement was put in. The cost of the work at the Hyde Park crib was $2,300, and the plant is now being maintained by one engineman, thus saving the wages of one engineman and eight laborers for four months; two enginemen and eight laborers were required in previous winters. Another feature of the new arrangement is that the fish screens can be kept in place during the winter, thus insuring a purer supply of water, as heretofore the screens have had to be removed as soon as the ice commenced to form. At the Hyde Park crib the intake ports and the ports in the protection breakwater are well below the surface of the lake, so that the only ice to be cared for is what forms in the well. It is only at cribs where the ports are under the surface that the new arrangement can be used. It is intended next summer to enclose in a similar manner the Four-Mile crib, off Fourteenth street, and the Lake View crib and install steam heating apparatus. This method, however, cannot be applied to the Two-Mile crib on account of the surface ports through the crib and the gap in the protection breakwater; this latter crib furnishes through three tunnels about one-half of the entire water supply of Chicago.

The great engineering strike in England has collapsed. The men have withdrawn their demand for the 48-hour week, and the Amalgamated Society of Engineers has an empty treasury, and must have lost tremendously in power and reputation. The outcome has been great loss of trade, foreign and domestic, to the English manufacturers, loss of wages to the men, suffering among thousands of families and a staggering blow to the trades unions. *The Engineer* estimates that the total loss in wages has been £2,400,000, and that the cash withdrawn from the treasuries of the unions or contributed as levies amounted to £900,000. Or the dispute has cost the men $16,500,000, or say $15,000,000 on the lowest estimate. It is a pity that the detailed facts of this long and resolutely fought contest cannot be made intimately known to the working men in our own country. It has been perhaps the most disastrous strike in history, much more so than that of the locomotive engineers on the Chicago, Burlington & Quincy; but it may be useful if the working men in English-speaking countries learn the futility of striking against reason and against the weight of public opinion.

An example of a quick return from bankruptcy to prosperity is shown by the Oregon Railroad & Navigation Co., which only a year ago last summer escaped from the Receiver's hands. Its report for the last half of 1897 (the first half of its fiscal year) shows its net earnings to have been in that time sufficient to meet its fixed charges and about *six times* the 2 per cent. dividend paid on the preferred stock, or to about 3¾ per cent. on both common and preferred stock. It is not better business alone that has made this possible; the reorganization reduced the fixed charges; the net earnings during the receivership went far toward rebuilding the road, which needed it after it had been for years worked by a bankrupt lessee; and the half-year ending with December yields probably nearly twice as much gross and more than twice as much net as the half-year ending with June; though the Klondike rush may lessen the difference this year. When all is said, however, the change is a notable one.

Some of our readers have thought of the long Siberian Railroad as a possible customer for American rolling stock and railroad appliances, but probably few have imagined that it would make a market for our lumber. Russia having lumber of its own to export. But lumber is what it is taking from us, if we may trust an advertisement of a lumber manufacturing company in Portland, Or., which contains an engraving of a big steamship lying at a dock with the inscription "British steamship Glenlochy, 2,997 tons, loaded with 2,737,180 ft. lumber, 1,589,100 laths, 155,900 pickets, 56 spars, for Vladivostock, Siberia." Nothing but the building of the Siberian Railroad could have made a market for so much lumber in Vladivostock.

NEW PUBLICATIONS.

Engineering and Architectural Jurisprudence. By John C. Wait, M. C. E., LL.B., M. Am. Soc. C. E. New York; John Wiley & Sons, 1898; 8vo., pp. lxxx., 905. Cloth, $6; sheep, $6.50.

This is a work on the law of construction, for engineers, architects, contractors, builders, public officers and lawyers. The author is both an engineer and a lawyer, and has aimed to gather in one volume the information which an engineer wants about the law and that which a lawyer wants about engineering. The work is more elaborate and comprehensive than any thing of the kind heretofore made, and is, therefore, in a sense, a pioneer in its field. The best previous work of the kind is Johnson's "Engineering Contracts and Specifications," which is an engineer's book, treating the legal side of the subject but briefly; the present work is a regular law digest, made by an engineer. There are no signs of the crudities and the incompleteness that one expects to find in a pioneer work. Professor Wait writes clearly, and he has evidently given to this book a great amount of labor. He has had experience in both his professions, and, furthermore, has proved his engineering knowledge by the severe test of teaching, having been for some years Assistant Professor of Engineering at Harvard University. These qualifications lead one to expect to find in this volume a valuable work, and the expectation is not disappointed.

Part I., on Contract Law, is designed especially for students in engineering and architectural schools. Part II., "Bids and Bidders," is mainly for public officers and contractors, and Part III. gives all the minute instructions necessary in drawing up contracts. The cases cited as authorities number up into the thousands, the list of them, in small type, taking about 40 pages. There is also an index, filling 75 pages, and the cross references are abundant, thus facilitating the work of the student in the greatest possible degree. Part I. explains the essential elements and general principles of a legal contract, explains the bearing of statutes of fraud and of limitations, and in fact gives a complete exposition of the law of contract. Part II. gives forms of bids and of advertisements and sets forth the rights and liabilities of parties contracting. This department is valuable for private individuals as well as for corporations. Part III. deals with contracts and specifications in a most thorough manner; describes the duties of the engineer both to the contractor and to the owner, and also goes exhaustively into customs and usages, explaining how far they may influence interpretations and estimates. This part closes with a chapter upon the closing of the contract by final estimate or certificate, and the influence, upon the final settlement, of previous estimates of progress and payments on account.

Part IV. is one of the most readable portions of the book to the layman. It takes up the relation of the engineer and the architect to an employer as a servant, as a professional man, as a public officer and as an expert witness. The property rights of the professional man in his notes, designs and inventions are fully treated.

The busy engineer is likely to criticise the work as lacking in conciseness. It can hardly be called too full, as the classification of subjects is thorough and minute, and if one masters the 20-page table of contents he cannot fail to find what he wants; but in writing for the layman and the young student, the author has amplified a good many paragraphs to tell things that the engineer and the lawyer already know. But this is a fault which lawyers will readily forgive, as it is one of their own, and unforgiving engineers can have the satisfaction of knowing that even those parts most suggestive of redundancy furnish interesting reading. This fullness of treatment makes the book valuable, of course, to a large class of readers who could not use a condensed work on a subject so full of technicalities.

The arrangement and treatment of the general subject of this work is comprehensive, and though distinctly a law book it is just such a law book as the engineer or architect wants in his library. It is perhaps fair to say that Professor Wait is first an engineer and then a lawyer; and he has gathered from the great mass of law reports all the most valuable of those decisions which an engineer is most likely to want to refer to whenever he has to deal with a legal question. The general law of contract may, of course, be found ably presented in other books, but its special application, with an ample supply of intelligent interpretations from an engineering standpoint, is here presented for the first time.

Machine Design. Part I., Kinematics of Machinery. By Forrest R. Jones, Professor of Mechanical Design in the University of Wisconsin. New York: John Wiley & Sons, 1898. 8vo, pp. 160, with index. Price $1.50.

Professor Jones has attempted to give clearly and concisely the principles of mechanical motion in such a manner that their application can readily be made to any mechanism, for determining the motion of any of its parts, and then to show the methods of dealing with such problems as the designer meets daily. He says that he has freely consulted all available works and he makes especial mention of "the clear and concise work" of Prof. Albert W. Smith, of Stanford University. Numerous foot notes throughout the pages show sources of information or point to authorities to be consulted by those who wish a more elaborate development of particular points. The first chapter deals with general principles and definitions and occupies 34 pages. The chapters which follow are: Toothed Gears, Couplings, Belt Gearing, Cams, and Parallel and Straight Line Motions. The matter seems to be simply and logically presented; the typographical arrangement is very good, as are the drawings and press-work.

TRADE CATALOGUES.

Brown & Sharpe Mfg. Co., Providence, R. I., send us their 1898 catalogue and price lists. It is the familiar little blue volume of 437 pages, divided into two sections, one covering machine tools and the other small tools, and has a very full alphabetical index of 12 pages. The principal additions this year are: Automatic cutting-off machine, automatic screw machine, automatic turret forming machine, belt polishing machine, universal grinding machine, improved No. 2, 60-in., arbors for face milling cutters with inserted teeth, face milling cutters with inserted teeth, inside micrometer gage, micrometer calipers Nos. 9 and 11, micrometer depth gage, screw-slotting cutters ground for clearance, slide caliper rule, spiral gears and tools for use in screw machines. Everybody knows the variety and quality of tools made by this famous house and it is unnecessary to say more than to call attention to the fact that the 1898 catalogue is issued.

High Pressure Hydraulic Fittings and Flanges.—The Tight Joint Co., of 159 Bank street, New York, has just issued an 80 page 5 × 7-in. catalogue prepared by Mr. John Platt, which gives an excellent discussion on the subject of high pressure hydraulic fittings and flanges. The catalogue is divided into three parts, the first of which is occupied with a discussion of Folly's patent flanges and tight joints. In this part, useful tables and the results of tests are given in some detail. The second part contains information useful in designing hydraulic plants. Numerous tables and carefully compiled data are here published. In the last part, hydraulic pressure transmission receives careful consideration, and especial attention is called to formulæ for flanging dies prepared by T. R. Browne, which, together with other formulæ here printed, should prove of considerable value to manufacturers. A complete index adds materially to the usefulness of this well prepared catalogue.

The Walker Company has recently issued pamphlets descriptive of the mica insulation, marine generators, arc lamps, pivotal trolley, with Grover trolley head and type "S" Solenoid blow-out controller, all of which apparatus and machinery are included among the new designs of the company. The description of the type "S" controller has also been published as a brochure, with a number of illustrations. One of the special features of this device is that an emergency braking effect by short circuiting the motors is obtained by turning the handle of the controller to the seventh or "emergency" notch. These controllers for a 25 H. P. equipment weigh 200 lbs., and the rheostat for this power weighs 90 lbs., making the weight complete, 490 lbs.

The Goulds Mfg. Co., Seneca Falls, N. Y., has just issued a special circular and price-list of additions to its very complete line of pumps. These are manufactured especially for the export trade and comprise brass cylinder pitcher spout pump; cistern suction pump; two-cylinder suction pump; odorless diaphram force pump; "Baltic" hand fire engine; two-cylinder force pump; swan-neck fire engine, and swan-neck village fire engine. They are illustrated and with complete data as to efficiency, etc. A table showing the value of American money in pounds sterling is also given.

Stow Flexible Shaft.—The Stow Mfg. Co., of Binghamton, N. Y., sends us a 50-page catalogue, descriptive of the well-known Stow flexible shaft, which has been described and referred to for many years in our columns, and this notice is to simply call attention to the fact that such a catalogue has recently been issued.

The Boston Belting Co., 256 Devonshire street, Boston, Mass., has issued a new catalogue of garden hose. It contains a number of illustrations and complete price lists of cotton and rubber hose, couplings, nozzles, sprinklers and reels.

Tests on the Chicago Storage Battery Road.

(*Continued from page 79.*)

the unfavorable conditions, the engines were overloaded and had a vacuum of but 24¼ in. The indicator cards taken with one engine operating one generator showed a friction load of 32.26 I. H. P., which is but about 15 per cent. of the average I. H. P. The commercial efficiency of the generator is shown to be 93.1 per cent., which efficiency was obtained when the generator was running 32 per cent. below its rated capacity. The total efficiency from the coal pile to the switchboard comes

to 5.58 per cent., and a comparison of this figure with that obtained at the Chicago Edison Company's station in Harrison street shows that the net efficiency of the plant tested is 20 per cent. better than that of the Edison station, which has an output of over 3,000 H. P., while the Englewood station has a maximum capacity of but 500 H. P. The cost of fuel for a net kilowatt hour on the switchboard of the station tested is shown to be .611 cent. As the result of a two days' run with coal at the price named the cost of fuel per car mile was .996 cent and the pounds of coal per net kilowatt hour were 6 44.

Fig. 3 gives the results of the readings taken on one of the cars every five minutes during the test while it was performing regular service and Fig. 4 shows the results of a speed trial for 60 seconds. In this figure *A*, *B*, *C*, *D* and *E* were the readings obtained for the watts used, while the controller was placed at the five points representing the connections as follows: *A*, the four sets of batteries in parallel; *B*, batteries in series parallel in sets of two; *C*, batteries in series with resistance; *D*, batteries in series without resistance; *E*, same as *D* with field of motor shunted. The speed of 15 miles an hour attained at the end of the 60 seconds was after a run of 986 ft., showing at a glance that it is hardly worthy of comparison with the speed of electric and other cars which have been recorded, but it should be stated that the equipment of this car was designed to enable it to attain normally a speed of but 15 miles an hour. The above tests were made on a 13½ ton car driven by a 50 H. P. Walker four-pole series motor. The entire current used at any one time passed through the armature, so that the ammeter was inserted in the positive brush leads. It should be noted that the record in Fig. 3 may not be a typical one, inasmuch as difference ways of charging and arranging the battery might show quite different results in the output, even though two cars were running under similar conditions.

From the facts obtained from the tests, the improvements suggested include the overhauling of the engine, the repair of the economizer flue and the securing of a better coal than was used on the test at a che aper price

The Central Railroad Club's Trip to the Niles Tool Works.

After the annual banquet of the Central Railroad Club on Friday, Jan. 21, 25 members of the Club availed themselves of the invitation of the Niles Tool Works Company to view their works at Hamilton, O. A special car was provided by the Niles people, which was attached to the Southwestern Limited, leaving Buffalo at midnight and run by way of the Lake Shore and the Big Four to Dayton, and over the C., H. & D. to Hamilton, O.

These extensive works presented so many interesting things that the time was only too short to do justice to the plant. The railroad men present were quite familiar with the quality and variety of the tools made by the company, consequently the details and processes of the manufacture of these particular tools were especially interesting from the fact that the members were so well acquainted with the tools themselves.

On the erecting floor could be seen tools for several foreign countries and a number of special tools for large manufacturers embodying novel specialties which would tend to greatly reduce the cost of the various kinds of work the several machines were designed to perform. What was of, perhaps, as great an interest to the men present as any other feature of the shop was the government work under course of construction. The Niles people are furnishing a number of disappearing carriages for 10-inch guns, and mounted on the floor was one installation complete, ready for shipment to the proving grounds. The various ranges of motion possible in operating the disappearing carriages, method of handling, etc., were intently watched, while the fine machine work involved and accuracy required to produce the results acceptable to the government specifications commanded admiration as representing the capacity of the works to do exact and precise work. In addition to this part of the government equipment being manufactured at these works, there is a separate shop devoted to furnishing mortars and guns. In this shop all the processes of boring and rifling and finishing were in progress. The special tools designed for this work and the engineering features involved being somewhat out of the line of the ordinary railroad men's experience, a greater impression was made upon those present on this account.

The Decision in the Sprague Motor Case.

A decision has been rendered in the case of the Sprague Electric Railway & Motor Co., against the Union Railway Co. and others, the decision being in favor of the plaintiffs. This case, in fact, was the General Electric Co. against the Walker Co., in the matter of the method of suspending motors. The decision, considerably condensed, is as below:

This suit is brought upon patent No. 324,892, dated Aug. 25, 1885, and granted to Frank J. Sprague for motor consisting of a field-magnet journaled on the axle of the driving wheels at one end, and hung upon a spring from the truck, or the car body, at the other, and carrying the armature shaft upon its pole pieces parallel with the shaft of the driving wheels, and connected to them by gearing.

The claims in question are:

2. The combination of a wheeled vehicle and an electro dynamic motor mounted upon and propelling the same, the field-magnet of said motor being sleeved upon an axle of the vehicle at one end, and supported by flexible connections from the body of the vehicle at the other end.

6. The combination with a wheeled vehicle, supported upon its axles by springs, of an electro-dynamic motor flexibly supported from such vehicle, and centered upon the driving axle thereof.

9. The combination with a wheeled vehicle, of an electro-dynamic motor centered upon the driving-axle thereof at one end, a spring support for that end of the motor from the truck or body of the vehicle, and relieving axle wholly or partly of dead-weight, and a spring support for the other end of motor from the truck or body of vehicle.

This patent was before the Circuit Court of Appeals for the Eighth Circuit, in Adams Electric Railway Co. vs. Lindell Railway Co., which was brought upon a patent dated June 24, 1884, granted to A. Wellington Adams. If Sprague's patent was for merely hanging and centering one end of the motor of a carriage upon the axle of the driving wheels, and suspending the other by a spring from the body of the vehicle or the truck, it would be shown from that case to be lacking in novelty and void. No one had before, however, hung a field magnet at one end upon the axle of the driving wheels, and at the other upon a spring from the body of the car or the truck, and an armature axle upon the pole pieces of the magnet, parallel with and geared to the axle of the driving wheels, for driving a car by a current of electricity. This combination simplified greatly the required structures, improved their results and came into immediate use. The invention of it seems to well support these claims of the patent.

The defendant's structures differ in some respects from those of the patent, but have all these parts working together in the same relation to each other, for the same purpose and producing the same result. They are altered by the addition of a joint in the motor and of another spring to help carry it, but not by dispensing with any of the parts; they are improved upon but not departed from. The defendant's improvements are not made independent of and clear from Sprague's, but upon his, and his patent appears to be infringed by this taking of his invention to improve upon. A decree was given for the plaintiff.

An injunction has been issued against the Walker Co., and an appeal has been taken from Judge Wheeler's decision, but the Court refused to suspend the injunction against the Walker Co., although it allowed the Union Railway Co. to continue to run the 10 motors it had already in use, but it prohibited them from purchasing any more. An accounting has also been ordered to be made by both defendants.

Electric Railroad Situation in Montclair, N. J.

About three years ago the North Jersey Street Railway Co., now the North Jersey Traction Co., which is controlled by the Consolidated Traction Co., made application to build an electric road through the town of Montclair, one mile and a half on Bloomfield avenue, connecting on the east (in Glen Ridge) with a proposed line to be built by the company, running six miles east to Newark, and on the west of Montclair (in Verona) with a proposed extension running west through Calwell and several smaller towns and boroughs. The roads on both sides of Montclair have been running for some time, but the town will not grant a franchise for a connection through Montclair, however, claiming a moral as well as a legal right to protect themselves against the unjust plans of the company. The condition is as follows:

The town of Montclair is about nine miles long and one and one-half miles wide. It lies on the eastesn slope of the First Mountain of the Orange Range. There is no way of crossing the mountain except by Bloomfield avenue, the road on which the North Jersey Traction Co. desires to run its cars. The railroad company also propose to build branch lines running north to Paterson and south to Orange. The fare is five cents from Newark to Glen Ridge and six cents to the east boundary line of Montclair. When completed through Montclair, the electric railroad company proposes to charge six cents to the foot of the First Mountain, and 10 cents on each of the branch lines running north and south. The Montclair Council demands that only five cents shall be charged to the foot of the First Mountain, claiming that it is unreasonable to charge a single fare of six cents to Newark, when other towns, also on the east side of the mountain, are paying only five cents; but Montclair is willing to allow a 10-cent fare to be charged from the top of the ridge to Newark. The people also demand that within every part of the township of Montclair, on either the Paterson or Orange branches, the fare shall be five cents after a period of five years. If all other terms are agreed to, including certain regulations in regard to macadamizing the roads, Montclair is willing to grant a perpetual franchise for the same line, and a 40-year franchise on the branch lines.

At a meeting of the Town Council, held on the evening of Jan. 31, the Franchise Committee of the Council granted the North Jersey Traction Co. the right of way on Bloomfield avenue through the town, but the property owners along the route are asking on an average of five dollars a foot of frontage for the right to pass their property. The railroad company state that they will fight the matter in the courts rather than submit to such demands.

The New Jersey law allows the local board, in each town or borough, to grant or withhold franchises to street railroads in their limits, and it is this law that has enabled Montclair to thus far successfully withstand the combined attack of the other towns and of the railroad. The electric railroad threatens to demand that a law be passed which will take away from any town the right to stand in the way of the interests of neighboring towns and boroughs.

The prospects are that the North Jersey Traction Co. will eventually give Montclair the "go by" and connect the Calwell branch of their road with the trolley in West Orange by running a road behind the First Mountain. Though making the distance considerably longer to Newark, it is the only way in which that city can be reached. The trolley company filed with the Town Council of Montclair, on the evening of Jan. 31, an application for a franchise for the south line branch, and on Feb. 7 will ask for the north line. Both franchises will be granted if the consent of two-thirds of the property owners along these routes can be secured.

A "lightning express" between St. Petersburg and Moscow was to be put on last November, to leave either terminus at 8 o'clock in the morning and arrive at the other at 4 in the afternoon. The distance is about 400 miles. This, the oldest railroad of any length in Russia, is still a single-track road, but it is said that a second track will be laid when the Siberian Railroad is finished.

TECHNICAL.

Manufacturing and Business.

S. E. & H. L. Shepherd, of Rockport, Me., have in use an electrically operated cableway built by the Lidgerwood Mfg. Co., of New York, in which electric motors are installed in twins, operating the hoisting drums, located near the head tower. The machine works with remarkable smoothness. It employs the standard Lidgerwood carriage and Miller fall rope carriers.

Among the improvements now being made by the Benjamin Atha & Illingworth Company, at Harrison, N. J., is a steel building 30 ft. square and about 40 ft. high; 35 ft. above the ground is a circular trolley track carried by the roof trusses. The frame of the building is of steel throughout and the siding and roofing of corrugated iron. The contract has been given to the Berlin Iron Bridge Company.

The Pratt & Weir Chuck Co., formerly of Hartford, Conn., has removed its headquarters to Plainville, Conn., where a new factory has been built to accommodate increasing business. C. H. Cooley, late with Pratt & Whitney Co., has been made General Manager.

The General Electric Co. has shipped the last of 240 motors for the South Side Elevated of Chicago. This company has also received an order for 36 175 H. P. motors for the Metropolitan West Side Elevated road of Chicago, this being the second order from that road.

The Goodwin Car Co., 96 Fifth avenue, New York City, has leased 20 of its new all-metal gravity dumping cars for five years' service at the excavation now going on at Jerome Park, New York, for the new city aqueduct.

The Pooley coupler made by the Pratt & Letchworth Co., Buffalo, N. Y., has been specified on the 1,000 cars for the Beech Creek Railroad, referred to in our issue of Jan. 24.

The Foster Engineering Co., of Newark, N. J., has declared a dividend of 10 per cent. out of the net earnings for 1897.

J. W. Gardner has resigned the position as manager of the Chicago branch of Manning, Maxwell & Moore to associate himself with the Stirling Company of Chicago, which makes the Stirling water-tube boiler.

Charles H. Duell, Vice President of the Peckham Motor Truck & Wheel Co., of Kingston, N. Y., has been named by President McKinley as United States Commissioner of Patents, to succeed the late Major Benjamin Butterworth.

Craig Ridgeway & Son, Coatville, Pa., has received a contract from the Buhl Steel Co. of Sharon, Pa., for a steam crane to be used for loading slabs and billets into cars.

Wm. B. Scaife & Sons have secured the contract for the erection of the building of the Pennsylvania Car Wheel Co. at Allegheny, Pa. The company intends at the present to manufacture cast iron car wheels exclusively.

The Riter-Conly Co., Pittsburgh, Pa., has received a contract for a steel warehouse for the Pennsylvania Tube Works. This company has recently built two steel tanks for Lacy & Co., Los Angeles, Cal., for the storage of crude oil. They are each 30,000 barrel capacity, 85 ft. in diameter by 30 ft. 6 in. high. The Riter-Conly Co. has also just completed a stand-pipe for the W. H. Hamilton Glass Co. as Charleroi, Pa. It is 10 ft. in diameter by 70 ft. high.

Edward M. Hagar, M. E., and Samuel A. Mendenhall, M. E., have formed a partnership under the name of Edw. M. Hagar & Co., with offices in The Rookery, Chicago, Ill. They will act as sales agents for all the products of the Southwark Foundry & Machine Co., of Philadelphia, which consists of Porter-Allen automatic steam engines, vertical engines, reversing engines, blow-

ng engines, centrifugal pumps, rotary pumps, water works, pumping engines and Weiss counter-current condensers. They are prepared to handle a contracting engineering business in connection with machinery.

The Siddell Automatic Safety Car Coupler Co., of Chicago, Ill., has been incorporated under the laws of that state by C. Christian Steinmetz, John W. Steinmetz and Frederick F. Siddell. The capital stock is $25,000.

The 5,500 cars now being built for the Baltimore & Ohio Railroad will be equipped with Buckeye couplers, made by the Buckeye Malleable Iron & Coupler Co., Columbus, O., as will also the 1,000 cars recently ordered by the Baltimore & Ohio Southwestern.

The Empire Transportation Co. has been incorporated under the laws of New Jersey, with a capital stock of $3,000,000, to operate a line of steamers from the Pacific coast to Alaska. It is composed of members of the International Navigation Co.

The sale of the plant, property and appurtenances of the Memphis Car & Foundry Co., which was to have taken place Jan. 24, has been postponed for 10 days.

The Carpenter Automatic Valve Co. has been incorporated to manufacture and sell safety devices for steam boilers, with a capital stock of $250,000, by W. C. Bullitt and Wm Morris of Philadelphia; John Tuohy, of Norfolk, Va., and Alexander Dreer, of Camden, N. J.

Iron and Steel.

At the annual meeting of the Franklin Steel Casting Co., Franklin, Pa., held recently, the following Board of Directors was elected: C. W. Mackey, Charles Miller, J. W. Rowland, W. J. Bleakley, O. D. Bleakley, D. H. Boulton, W. H. Forbes, H. M. Wilson, Robert McCalmont.

A decree has been entered by the Court directing the sale of the Ella furnace at West Middlesex, Pa., owned by Boyce, Wheeler & Co., the sale to be made at the discretion of the Masters.

John Gearing, formerly with the J. Painter & Sons Co., of Pittsburgh, has been made special manager of the Peoria Iron & Steel Co., of Peoria, Ill.

The plant of the Harvey Steel Co., at Harvey, Ill., including 17 acres of land, several buildings and all equipment, was sold at the Real Estate Board of Chicago on Jan. 28 for $150,000, the property being bid in for the first mortgage bondholders. The foreclosure was to satisfy a mortgage of $125,000, with accrued interest and costs, amounting in all to $170,000. The plant has not been in operation for about two years.

The Homestead Steel Works, of Homestead, Pa., are converting their 33-in. mill into a girder rail mill.

Charles McCreary, who for the past four years has been Assistant General Manager of the Dunbar furnace, and for six years previous Superintendent of the Troy Steel & Iron Co.'s furnace, has been made Superintendent of the Duquesne furnace of the Carnegie Steel Co., Ltd.

The Eleanor Iron Co., with works at Hollidaysburgh, Pa., manufacturers of muck iron, merchant iron and skelp, has discontinued business and surrendered the mill to the bondholders. The cause assigned is low prices for bar iron and the other products of the plant.

The Oregon Short Line Railroad Co. has placed an order with the Illinois Steel Co. for 15,000 tons of 70-lb rails. The Laramie Rolling Mill Co., of Laramie, Wyo., has secured a contract for the necessary fittings for these rails. The rails will be used to replace lighter ones now in use.

At the annual meeting of the stockholders of the Glasgow Iron Co., Pottstown, Pa., the following Directors were elected: Benjamin H. Shoemaker, Samuel A. Bacon, Philadelphia; Jos. L. Bailey, Edgar S. Cook, Comly B. Shoemaker, Pottstown, Pa. President, C. B. Shoemaker; Secretary, Harry W. Prizer; Treasurer, O. E. Shuler.

The Pittsburgh Wire Co., of Braddock, Pa., has elected the following officers: President and Treasurer, Thomas Walker; Secretary, James A. Farrell. Directors: Alexander Dempster, Thomas Walker, James H. McCrady, Joseph Kountz and Thos. W. Fitch

The American Iron & Steel Co., of Troy, N. Y., has been incorporated with a capital stock of $25,000. The Directors are: John E. Gaitley, David H. Friedman and Frank White, Albany, N. Y., and John Robinstein and Benjamin E. Porter, of Philadelphia, Pa.

It is stated that the Bar Iron Association, comprising the manufacturers of this commodity in the territory west of Pittsburgh, at a meeting held Jan. 28, voted to advance the price $2 per ton.

New Stations and Shops.

The matter of a new station at Albany for the New York Central & Hudson River is still under advisement by the executive officers of that company. Up to the present nothing further has been done than the preparation of preliminary designs by Shepley, Coolidge & Rutan, of Boston, Mass.

The Eastern Railway of Minnesota will build a merchandise warehouse at Superior, Wis., which will have 600,000 sq. ft. of floor, being 1,500 × 200 ft., and two stories high. There will be 7,500 piles in the foundation.

Press dispatches state that the Gulf, Colorado & Santa Fe is now advertising through its Chief Engineer, C. F. W. Felt, Galveston, Tex., for bids on the building of a stone machine shop 120 × 400 ft., at Cleburne, Tex.

We learn from the International & Great Northern Railroad that the new union depot at Houston will be built by their own force, the work all being done by the bridges and building department.

The Youngstown Iron & Steel Roofing Co., Youngstown, O., has increased its capital stock, and intends building an extension to its plant, having recently completed matters for the manufacture of expanded metal lathe and fireproof flooring and bridge floors. The company states that its business outlook for the coming year is quite flattering.

The "Brackin" Pipe Wrench.

The Brackin Manufacturing Co., of Cleveland, O., is making a new pipe wrench, which is believed to be an improvement over the types now common in use. One object is to provide a wrench having a stationary jaw with a yoke firmly secured and provided with a movable drop-jaw, and so made that the fulcrum or bearing of the movable jaw will occur at that point of the wrench where the stock is the strongest. Durability and strength have been regarded as of the first importance. The jaws and pawl are drop forged from tool steel, special attention being given to tempering. The yoke and lever are drop forged from machinery steel. The surface of the lever which comes in contact with the end of the pawl is casehardened, and the fulcrum rivet in the under side of the arched portion of the yoke is tempered. All parts are interchangeable. The stationary jaw (not shown in the illustration) fits securely on the lever, and as the strain is upward forms a lock joint. In turning a pipe the movement of the pawl is downward, making practically another similar joint. This formation and arrangement of parts relieves the yoke of strain. By the pawl thumb piece the teeth are

disengaged, and the jaw being released can easily be moved in or out. To operate in close quarters or to adjust for a smallar pipe, it is only necessary to push on the lever, resting the jaw on the floor or against the pipe, when it adjusts by the ratchet movement. This shows how easily the wrench can be used with one hand. The object of the pawl thumb piece is merely to disengage the ratchet teeth, which bears no strain, as the strain is on the pawl and not on the disks in the side openings of the yoke. Having a sensitive fulcrum, locking of the wrench on a pipe is made impossible. It secures a firm grip, will not plane a pipe and releases its hold readily. A sidewise turn of the lever or a light pressure on the end of the jaw will free the wrench from the pipe. Crushing is prevented by the upper end of the movable jaw, stopping when it strikes the top of the yoke.

The Chicago Eight-Track Bridge.

The proposed eight-track bridge over the Chicago Drainage Canal near Campbell avenue, referred to in our issues of Dec. 31 and Jan. 21 last, still continues to be a matter of lively interest. The latest report now comes to us that the Pittsburgh, Cincinnati, Chicago & St. Louis Railway, after a number of conferences with the Sanitary District engineers, has refused to accept the design for a swing bridge submitted by the Sanitary District, and on the other hand this road has signified its willingness to accept the competitive designs of either Mr. C. L. Strobel or the Scherzer Rolling Lift Bridge Company; we are not informed whether the design of the Edge Moor Bridge Works has yet been approved. Only one railroad interested approved the plans of the swing bridge, and as the Bridge Engineer for the Sanitary District is virtually Consulting Engineer for this road, it is but natural that he should approve his own work. The wisdom of the two remaining roads in refusing to accept the design of the Sanitary District will be apparent to all railroad men familiar with the conditions at the site of this proposed bridge.

New Spiral Packing for Piston and Valve Rods.

The Boston Belting Co., 256 Devonshire street, Boston, Mass., is placing on the market a spiral round piston and valve rod packing which it designates as Nox-All, a trademark the company is now applying to various other lines of goods as well as packing. The Nox-All packing is made in the form of a continuous spiral coil, and consists of a round red rubber core surrounded by layers or piles of specially woven duck, and the outside is thoroughly coated and lubricated with a selected grade of fine plumbago entirely free from acid or grit. This packing is soft, elastic and durable, will withstand the heat of high-pressure steam, and combines all of the desirable features of a first-class piston and valve rod packing.

Fire Boat for Chicago.

Plans have been prepared by A. W. Goodrich, Marine Architect, for a new steel fire-tug for Chicago, and bids will be asked as soon as the plans receive the approval of the Mayor and Chief of the Fire Department. The length of the boat over all will be 118 ft., beam 24 ft. and depth 11 ft. 9 in. It will have three sets of pumps, with a capacity of throwing 10,000 gals. of water a minute. The capacity of the two tugs now in use is 6,000 gals. a minute. The estimated cost of the boat will be $50,000, and the expenditure was provided for by ordinance some time ago. It is expected that the new tug will be ready for service by May 1, and that it will be assigned to duty in the downtown district.

Electric Locomotives for London.

The General Electric Co. has received an order from the British Thomson-Houston Co., Ltd., for 32 locomotives for the Central London underground railroad. The locomotives will each weigh about 45 tons and will be equipped with a total of 800 H. P. and motors. The trains to be hauled will be made up of five cars, giving a total load of 150 tons, 10 tons heavier than the ordinary Manhattan Elevated train. The schedule speed will be 15 miles an hour.

Government Armor Plant.

On Jan. 29 bids were opened at the Navy Department at Washington for building a government armor-plate factory or any part thereof and for furnishing a site. Of all the bids received, two were for doing all the work on the plant. A number of sites were offered, and several makers of machinery and other necessary materials submitted bids for furnishing their products. The bids will be sent to Congress for consideration.

THE SCRAP HEAP.

Notes.

The United States Circuit Court at San Francisco has decided that the Coal Dealers' Association of California is illegal, under the federal anti-trust law of 1890.

At Evergreen, Ala., on Jan. 19, Nelson Williams was convicted of wrecking a passenger train near Garland, Ala., on April 23, 1897, causing the death of five men.

The Goodrich Transportation Co. has bought the Christopher Columbus, the big white whaleback of the World's Fair. The boat cost $400,000, and was probably sold at about that price.

Attempts have been made this winter to use a snow locomotive in log hauling in the Minnesota pineries, but it is said that the efforts have been unsuccessful. This is due in part, possibly, to the fact that the winter has been too warm to make hard roads.

The Boston Terminal Co., which is building the new South Union station, has applied to the Massachusetts State Railroad Commissioners for approval of an issue of $3,000,000 new stock. It appeared at the hearing that the total cost of the station will be about $12,000,000.

The Grand Trunk Railway Literary & Scientific Institute of Montreal has just issued its annual report, from which it appears that the Institute has been in existence 40 years. It has a library of about 7,000 volumes and a well-stocked reading room. The assets of the institution, including the library, are valued at $11,730. The membership is about 700. The majority of the members are from the mechanical department of the road. Mr. Hays is President.

On Feb. 1 railroad traffic was badly interrupted by snow throughout New England, and to a considerable extent in New York and Pennsylvania. In eastern Massachusetts through trains were delayed 12 hours and more. Boston had no telegraphic communication for about 24 hours and all wires, including the telephone lines, were down for 18 hours. Many horses were killed in Boston by stepping on broken electric wires. Street railroads were blocked in many cities, including some in central New Jersey.

At Raleigh, N. C., eight civil suits have been begun against Vice-President Andrews, of the Southern Railway, to recover penalties amounting to $40,000 for refusing to testify in the inquiry now going on which seeks to prove that one of the State Railroad Commissioners accepted reduced rates or passes from the railroad company. Another branch of this North Carolina legal contest is the suit of Wilson against the state before the United States Supreme Court. This suit will be argued in Washington Feb. 21.

The Massachusetts State Board of Harbor and Land Commissioners has made a report dealing with the problem of improving the Connecticut River so as to make it navigable, with a channel 9 ft. deep, from Long Island Sound to Holyoke, 34 miles above Hartford, the present head of navigation. The cities desiring this improvement, Springfield, Holyoke and Chicopee, produce about $50,000,000 worth of merchandise annually and have, with their suburbs, a population of about 114,000. It is estimated that the desired improvement, which includes canals around the Enfield Rapids, 5½ miles long, would cost an amount equal to four per cent. on the annual value of merchandise produced as above. The cities named have been trying for years to get an appropriation from Congress for this improvement, and the report in the *Boston Herald* would seem to indicate that the State Commissioners think that the Federal Government is the proper source to look to for the money.

Wreck of a Lake Steamer.

Early in the morning of Jan. 27 the steamer City of Duluth, with a cargo of corn and flour, went aground on a shoal off St. Joseph, Mich., during a heavy gale and was probably completely wrecked. The 17 passengers and the crew of 24 were rescued by the life-saving crew. The City of Duluth was built in 1874 and in 1895 was valued at $40,000. Her tonnage is 1,310, length 202 ft., beam 36 ft., depth 13 ft. It was expected that a considerable part of the cargo could be recovered, but that the steamer would be a total loss.

A Department of Electricity.

The Mayor and Council of Chicago have created a Department of Electricity. The head of the department is to be appointed by the Mayor with the approval of the Council. It is understood that the present City Electrician, Edward B. Ellicott, will receive the appointment at a salary of $4,000 a year. There is to be an Assistant at $3,250 and a Superintendent of Construction at $2,000 a year. In the past this department has

been a part of the Fire Department, and the new ordinance stipulates that the Fire Marshal and the Chief of Police shall have control respectively of the fire-alarm and police telegraph branches of the service. The ordinance also provides that hereafter all contractors must obtain permits from the department before beginning any electric construction or repair work.

Proposed Railroad Legislation.

In New York Senator Nussbaum has introduced a bill to repeal the anti-scalper law passed last year. The hope of "beating" that clause of the State Constitution that forbids free riding, which springs eternal in the legislative breast, takes the form this week of a bill by Assemblyman De Graw "to regulate the exercise of franchises by transportation corporations." The bill directs the Secretary of State to issue to public officers a certificate specifying their term of office and providing that transportation companies shall pass free over their lines the holders of such certificates. Mr. Kavanaugh, of Saratoga, has an interchangeable mileage book bill requiring every railroad more than 100 miles in length to issue mileage books good on any railroad 100 miles or more in length, the price not to exceed two cents a mile. Another bill at Albany requires free ferriage for bicycles.

In New Jersey Senator Daly has introduced a bill requiring weekly payments of wages by manufacturing, mercantile, railroad, street, electric and elevated railway, steamboat, telegraph and telephone companies, municipal corporations, and water and express companies. The Kentucky House has passed a bill requiring railroads to transport bicycles as baggage In Iowa the "Temple" amendment, providing that no benefit received by any railroad employee shall operate to relieve his employer of liability for damages for personal injuries, has been adopted by the House. It is aimed at the relief department of the Burlington, and the subject was made an issue in the last state campaign. In South Carolina the Senate has passed a bill requiring railroad companies operating fast trains which do not stop at all stations to also run way trains stopping at every station between 7 a. m. and 7 p. m. The House has passed a bill to place express, telegraph and telephone companies under the control of the Railroad Commission as to rates, etc.

Train Rules in Rhyme.

Rock Island Rule 587.

Let this rule never be forgot,
With part air trains, don't fail,
Whate'er the time, where'er the spot,
To hold 'em by the tail.

To hold 'em by the tail, my boy,
To hold 'em by the tail,
'Twill take up slack and ease the whack,
To hold 'em by the tail.

When running thirty miles an hour,
And dipping through a swale,
Get out on top and use hand power
To hold her by the tail.

And where the hog back humps itself,
Though Westinghouse may rail,
Be sure you tumble to yourself,
And hold her by the tail.
—*Train Dispatcher's Bulletin.*

Increase of Duty on Bicycles in Germany.

The bill now pending affecting the German duty on bicycles comes up for the second reading this month. If it passes, the duty will be raised to $12.50 on each wheel. This will shut out the cheaper grades of bicycles; but that should benefit rather than injure the future of the United States trade, owing to the superiority of American wheels. Those well informed do not anticipate a change of tariff. The United States wheel has given much satisfaction, and is gaining in popularity. It would not be advisable, in Consul Keenan's opinion, to manufacture United States wheels in Germany; but the importation of pieces of American wheels, to be put together afterwards, might be worthy of serious consideration in case the proposed legislation is carried into effect.

A Burning Mountain.

On Jan. 19 the Fairview tunnel of the Santa Fe Pacific, near Ash Fork, Ariz., was found to be burning and men went in to extinguish the fire; but the wooden lining, already badly burned, fell while they were in the tunnel and four men were burned to death. Passengers had to walk around, about 1,500 ft. On Jan. 29 the newspapers reported that the Fairview tuunel was again on fire. The report says:

"Investigation shows conclusively that the new fire was caused by spontaneous combustion. In short, the tunnel is now nothing but the flue for an immense lime kiln, for it is really a mountain that is being burned. The geological formation of the mountain through which the tunnel passes is chiefly limestone of a high degree of purity.

"The fire of last week, together with the natural moisture of the soil and the water which has been used to extinguish the former blaze, has resulted in starting the lime in the mountain to slacking. The casing of the tunnel had been put in place and served to confine the gases from the slacking lime; finally they broke out, and, flaming up, set fire to the casing again. The lime, as it is slacked, is dissolved into gas, liquid and ash, which, falling out of place, releases the stratum adjoining of volcanic ash and lava.

"The railroad company has called in the best mining and consulting engineers in Arizona and New Mexico to study the situation. In the meantime the Southern Pacific tracks are being used."

The Hudson River Bridge.

The National Hudson Bridge Co., which recently had a bill introduced in Congress to authorize its incorporation with capital of $50,000,000, is practically a reorganization of the New York and New Jersey Bridge Co. The bill names Frank H. Lord, Ralph T. Rokeby, Gustave C. Henry and such persons as may be associated with them as incorporators. Beyond extending the time limit in which the bridge must be built this bill does not differ from the old one.

Fast Trains to Denver.

A new train from Chicago to Denver, to run through in 28 hours, is announced by the Chicago & Northwestern and the Union Pacific. The first trip will be made on Feb. 6. The train will leave Chicago at 10 a. m., arriving at Omaha at 1:55 that evening and at Denver at 1:30 the following day. Returning it will leave Denver at 3:30 in the afternoon and arrive in Chicago at 8:50 in the evening of the following day. No mail will be carried. Other through trains of the Union Pacific are to be accelerated.

The Burlington, not to be outdone, immediately announced that it would put on a new train like its "Overland Flyer," which was run in 1893, which will make the run from Chicago to Denver in 27 hours, or in one hour less than the Northwestern train.

The Year's Grain Production

Final estimates of the crops in the United States for 1897 by the Statistician of the Department of Agriculture are as follows:

Wheat, 39,465,066 acres; 530,149,168 bu.; $428,547,121 value.

	Acres.	Bushels.
Wheat, 1897	39,465,066	530,149,168
" 1896	34,678,646	427,684,346
" 1895	34,047,332	467,102,947
" 1894	34,882,436	460,267,416
" 1893	34,629,418	396,131,725
" 1892	38,554,430	515,949,000
" 1891	39,916,897	611,780,000
" 1890	36,087,154	399,262,000
" 1889	38,123,859	490,560,000

Corn, 80,095,101 acres; 1,902,967,933 bu.; $501,072,952 value.

	Acres.	Bushels.
Corn, 1897	80,095,101	1,902,967,933
" 1896	81,027,156	2,283,875,165
" 1895	82,075,830	2,151,138,580
" 1894	62,582,269	1,212,770,000
" 1893	72,036,465	1,619,496,131
" 1892	70,626,658	1,628,464,000
" 1891	76,204,515	2,060,154,000
" 1890	71,970,763	1,489,970,000
" 1889	72,087,752	2,122,327,547

Oats, 25,730,375 acres; 698,767,809 bu.; $147,974,719 value.

	Acres.	Bushels.
Oats, 1897	25,730,375	698,767,809
" 1896	27,565,985	707,346,404
" 1895	27,878,406	824,443,537
" 1894	27,023,553	662,037,000
" 1893	27,273,033	638,855,000
" 1892	27,063,835	661,035,000
" 1891	25,581,861	738,394,000
" 1890	26,431,369	523,621,000

Rye, 1,703,561 acres; 27,363,324 bu.; $12,239,647 value.

	Acres.	Bushels.
Rye, 1897	1,703,561	27,363,324
" 1896	1,841,201	24,369,047
" 1895	1,890,340	27,210,670
" 1894	1,944,780	26,727,615
" 1893	2,038,485	25,555,446

Barley, 2,719,116 acres; 66,685,127 bu.; $25,142,139 value.
Buckwheat, 717,836 acres; 14,997,451 bu.; $6,319,188 value.
Potatoes, 2,534,577 acres; 164,015,964 bu.; $89,643,059 value.
Hay, 42,426,770 acres; 60,664,876 tons; $401,390,728 value.

A Snow-Melting Car.

The Boston & Maine has a device for getting rid of snow which will be used at the union station in Boston and in the yards adjoining. A car rests on four wheels, but very low. Through it runs a long pipe with diverging arms and at frequent intervals through its entire length and that of the arms are small holes. When this car is attached to a shifting locomotive the pipe is connected to the engine. The snow is shoveled into the box and melted, the water running out into the river. It is calculated that this car can care for snow faster than 25 men can shovel it.—*Exchange.*

New York Railroad Commission.

Governor Black sent to the New York State Senate, on Jan. 27, the nomination of Frank M. Baker, of Owego, as Railroad Commissioner, to succeed himself.

A Western Idyl.

John Kennedy, who was acquitted last October of a charge of holding up an Alton train in Blue Cut, 12 miles southeast of here (Kansas City), started out tonight to rob another train. A horse that could not keep his footing on the icy pavement did more than the Kansas City authorities have been able to do. It prevented a train robbery. The horse fell before Kennedy had got well started, and the rider was knocked senseless. The police surgeon was called and it was found that the unconscious man had a shotgun, a heavy revolver, a false beard, a railroad lantern covered with red flannel and a black mask. He soon recovered consciousness, and is now trying to explain that he was going hunting.—*Exchange.*

LOCOMOTIVE BUILDING.

The Gila Valley, Globe & Northern has placed an order for two engines with the Baldwin Locomotive Works.

The Rarig Engineering Co., of Columbus, O., is rebuilding five locomotives for the Columbus, Sandusky & Hocking.

The St. Louis, Peoria & Northern has received the two new locomotives recently ordered from the Baldwin Locomotive Works.

The Brooks Locomotive Works, of Dunkirk, N. Y., have received an order to build two shifting engines for the Carnegie Steel Co., Ltd.

The Southern Indiana is about to place an order for four 10-wheel freight locomotives. It is understood that the contract will be given to the Baldwin Locomotive Works.

On Jan. 26 the Brooks Locomotive Works completed the shipment of the order for 20 8-wheel locomotives with separate tenders for the Imperial Government Railroads of Japan, which engines have been briefly described in these columns.

The five 10-wheel compound passenger locomotives for the Minneapolis, St. Paul & Sault Ste. Marie, the order for which was given to the Schenectady Locomotive Works, of Schenectady, N. Y., and referred to in our last issue, will have 20 and 32 × 26-in. cylinders, 73-in. driving wheels and weigh about 127,000 lbs. They will be equipped with Taylor iron driving axles, crank pins, piston rods and staybolts, magnesia sectional boiler covering and Boyer speed recorders. The engines are to be built to conform to specifications furnished by E. A. Williams, Mechanical Superintendent of the railroad.

The Baldwin Locomotive Works have received an order to build one inspection locomotive for the Philadelphia & Reading. It will have 14 × 20 in. cylinders, 60 in. drivers and weigh about 67,000 lbs., with 45,000 lbs. on the drivers; boiler, 42 in. in diameter, with 133 tubes 1¾ in. in diameter and 11 ft. 6 in. long; firebox, length, 77⅛ in.; width, 34¼ in.; depth (front), 44¾ in (back), 29 in.; truck wheels, wrought centers, steel tired, 27½ in.; truck journals, 4¼ × 7 in; driving axle journals, 6½ × 8 in.; tender capacity, 3,000 gals.; tender wheels, 33 in. in diameter. The passenger compartment will be handsomely furnished and finished in white oak. The locomotive will be equipped with Gould couplers, Leach sanding device and steam heat apparatus.

The Brooks Locomotive Works, of Dunkirk, N. Y., have received an order to build three 10-wheel freight locomotives for the Flint & Pere Marquette Railroad. The principle dimensions are as follows: Cylinders, 18 × 24 in.; driving wheels, 56 in. in diameter; engine truck wheels, 30 in. in diameter; boiler, Player improved Belpaire type 56 in. in diameter, with 204 2-in. tubes 12 ft. 7 in. long, No. 11 B. W. G.; firebox, long, sloping type, 96 in. long and 34 in. wide; brick arch on water tubes; rigid wheel base, 7 ft. 6 in.; driving-wheel base, 13 ft. 6 in.; engine and tender wheel base, 48 ft. 8 in. The engines will weigh in working order 115,800 lbs., with 92,000 lbs. on the drivers, and will be equipped with Detroit springs, Gould couplers, Jerome metallic packing, Leach sanders and Westinghouse tender and train brakes and American driver brakes. The tires will be of Midvale steel and the piston rods and crank pins of Coffin toughened steel. The locomotives are all for February delivery.

CAR BUILDING.

The Grand Trunk has placed an order with Pullman's Palace Car Co. for 20 passenger cars.

The Kansas City, Pittsburgh & Gulf is reported as about to place an order for 300 coal cars.

The Lake Shore & Michigan Southern will soon be in the market for several hundred box cars.

The Rio Grande Western will order some new box cars, but the number has not been definitely decided on

The Jacob Dold Packing Co., of Kansas City, Mo., contemplates buying 100 refrigerator cars in the near future.

The Wabash will buy some new coaches and dining cars. The number is stated to be 10 of the former and three of the latter.

The Minneapolis, St. Paul & Sault Ste. Marie has placed an order for the 20 tourists cars referred to last week with Pullman's Palace Car Co.

George T. Jarvis, Receiver and General Manager of the Louisville, Evansville & St. Louis, has been authorized by the Court to buy 500 freight cars.

The manager of the Commerce Dispatch Line, which operates the Southwestern Miller's Despatch, denies that new cars will be ordered for the latter, as reported by a contemporary.

The Missouri Pacific has placed an order with the Missouri Car & Foundry Co., of St. Louis, for 500 coal cars. They will be equipped with Westinghouse air-brakes and American Steel Foundry Co's bolsters.

The Glucose Sugar Refining Co., of Chicago, has placed an order for 50 tank cars with the Milton Car Works (Murray, Dougal & Co.), of Milton, Pa., and reported as contemplating buying 300 more.

The Pittsburgh & Western has placed an order with the Michigan-Peninsular Car Co. for 250 box cars, but the order for 500 hopper gondola cars had not been placed up to the time of going to press. Some or all of them may be steel cars.

The Pittsburgh & Lake Erie has placed an order with the Schoen Pressed Steel Co. of Pittsburgh for 100 steel cars of the Schoen design, self-clearing. They will have a capacity for carrying 100,000 tons of ore, or 85,000 lbs. of coal, and weigh 32,000 lbs.

The Bloomsburg Car Co., of Bloomsburg, Pa., has received an order to build 100 gondola cars for the Orang Free State Railway Co., of South Africa. It is stated that the company has also received an order to build 15 passenger cars for the same road.

The Union Pacific has asked car builders what deliveries they can make on from 1,500 to 4,000 cars, stock, furniture and box, based on 1893 specifications, modern improvements to be decided after orders are placed. We understand that contracts will be closed shortly, and for not less than 1,500.

The Pittsburgh & Lake Erie is about to issue specifications for 1,000 new 60,000-lb. box cars to be 34 ft. long inside and 7 ft. 6 in. high inside. The specifications will call for Westinghouse airbrakes, National Hollow brakebeams, Simplex and American steel bolsters, Security car doors, Tower couplers, McCord journal boxes and Cleveland-Chicago roofs.

The Goodwin Car Co., 96 Fifth avenue, New York City, is asking bids for building 30 of its new all metal gravity dumping cars for May 1 delivery. The dimensions of the cars are as follows: Length of car body, outside of buffer plates, 35 ft. 9¾ in.; outside end bulkheads, 32 ft. 10½ in.; main girders, 35 ft. 1 in.; side girders, 33 ft. ⅓ in.; valves, 15 ft. 11½ in.; width over all, 9 ft. 4⅛ in.; inside of girders, 8 ft. 9⅝ in.; height from top of rail to top of side girders, 8 ft. 9 3/16 in.; distance from center to center of trucks, 23 ft. 7⅝ in. The specifications call for McCord malleable iron journal boxes Harrison dust guards, Ajax metal journal bearings, Goodwin pattern style E bolsters made by Shickle, Harrison & Howard Iron Co., King's spring side bearings, National Hollow brakebeams, Christie brakeheads, Corning brake shoes, A. French Spring Co. bolsters and draft springs and Williams couplers.

The Boston Street Railroad Co. has placed an order with the St. Louis Car Co. for 80 open cars.

The Brooklyn Heights Railroad has placed an orde with the John Stephenson Co., Ltd., New York City, for the 50 car bodies referred to in our issue of Jan. 21.

The Metropolitan Street Railroad Co. has ordered 25 combination open and closed cars, similar to those used in the West, for experimental purposes; and 200 long open cars for use on the underground electric divisions, with the J. G. Brill Co., of Philadelphia, Pa.

BRIDGE BUILDING.

Allegheny, Pa.—The question is being discussed as to the advisability of building a bridge from Geyer to Shady avenues, across Wood's Run. Such a bridge, if built, would cost probably from $60,000 to $75,000, and would be from 800 to 1,000 ft. in length. The matter has been pending in the Councils for a long time and has been turned over to a Committee on Surveys, which includes the following: Messrs. Spiedel, Tschume, Baker and William Trimble.

Atlanta, Ga.—It is stated that the Central, of Georgia, and the Southern have come to an understanding with the city and will give $40,000 of the $75,000 required to build the Mitchell street viaduct. Work on the viaduct will probably commence this year.

Brighton, N. Y.—A bill has been introduced in the Assembly to appropriate $25,000 for building a lift bridg over the Erie Canal in Brighton.

Brookings, S. Dak.—Bids will be received until Feb. 15 by J. T. Nelson, County Auditor, for building a

wooden or combination bridge over the Sioux River, 60 ft. span.

Bucyrus, O.—The County Commissioners (Crawford County), it is reported, have plans for a new steel bridge over the Sandusky River, at North Main street.

Carnegie, Pa.—The Pittsburgh, Cincinnati, Chicago & St. Louis is negotiating with the borough authorities on the question of building an overhead bridge on Chartiers street.

Cœur d'Alene, Ida.—A bridge will be built here over the Spokane River near the military reservation.

Davenport, Ia.—The Davenport & Rock Island Bridge Railway and Terminal Co. held its annual meeting recently. The Directors organized by electing H. B. Shuler, President; F. P. Blair, Vice-President and General Manager, and D. T. Shuler, Secretary and Treasurer. The meeting determined with one voice to push the Crescent bridge to completion by the first of November.

Defiance, O.—The Wabash Railroad will build two overhead bridges over the tracks in North Defiance.

Kansas City, Mo.—Bids are wanted Feb. 7 for building a 50-ft. steel bridge over the east fork of Big Creek, 1½ miles east of Greenwood. T. F. Callahan, County Surveyor, Jackson County.

Little Falls, N. Y.—A new bridge will be built over the Erie Canal at Seminary street this spring. The bill authorizing this bridge and appropriating $8,000 for the work was passed in the Assembly three years ago, but the Board of Public Works petitioned the State Engineer not to build the bridge until the canal improvement was completed. Contract let.

Milwaukee, Wis.—Plans have been completed for the Grand avenue bridge, previously reported. They are for a lift bridge to cost about $45,000. G. H. Benzenberg, City Engineer.

The city government also has under consideration two other new lift bridges; one at Broadway, to cost about $65,000; another at Muskego avenue, to cost about $35,000.

Moro, Ore.—The commissioners of Sherman County have under consideration plans for a bridge over John Day River to connect Sherman and Gillman counties.

Mt. Vernon, N. Y.—The City Council is considering the advisability of building a bridge across the Hutchinson River, at Fulton avenue. Estimated cost, $8,000.

New Kensington, Pa.—The Council has granted a franchise to the New Kensington Bridge Co. to build a bridge from Ninth street to Bouquet Station. M. D. Wayman, President; Wm. Graham, of Pittsburgh, Treasurer; J. P. F. Peffer, Secretary.

Richmond, Tex.—It is stated that a bridge will be built across the bayou at Richmond.

Saginaw, Mich.—The city is considering the advisability of a new bridge at Bristol street.

The plans and estimates of City Engineer, H. C. Terry for a new bridge at Court street (*Railroad Gazette*, Dec. 31), to cost about $65,000 have been approved by the Board of Public Works.

St. Mary's, Ont.—The Town Council have instructed the Road and Bridge Committee to prepare plans and specifications for a bridge on Water street with stone abutments and steel superstructure.

Snydertown, Pa.—The Grand Jury has approved the reports of the viewers recommending that two bridges be built over Bald Eagle Creek in Snyder township.

Washington, D. C.—The District Commissioners selected the design of Mr. George S. Morrison, New York, for the proposed bridge over Rock Creek, recommending that the bridge be built in concrete. The estimated cost in concrete is $675,000.

Wilkesbarre, Pa.—Joseph D. Lloyd, City Comptroller, in his estimates for 1898 includes $22,000 for building new county bridges.

Windsor, Ont.—The Essex County Council will build two steel bridges at a cost of $1,800 each, one over the Canard river and the other over the county line.

Woonsocket, R. I.—Bids will be received until Feb. 14 for building a steel bridge over the Peters River at Wood avenue. Jonathan Battye, Chairman Committee on Streets and Bridges; Frank H. Mills, City Engineer.

Worcester, Mass.—There is talk of building a bridge across Like Quinsigamond. F. A. McClure, City Engineer.

RAILROAD LAW—RECENT DECISIONS.

The United States Supreme Court has decided that where two or more persons, who have made separate applications to a city council for the grant of a street-railroad franchise, enter into a contract between themselves to unite their interests, mutually co-operate in securing the franchise, and divide between them the profits realized by the enterprise, and thereafter the city council, with full knowledge of this contract, grants the franchise to one of these persons exclusively, who then forms a corporation, issuing all the stock to himself and his associates, entirely excluding the other person or persons, neither of the latter can obtain a decree in equity, declaring him to be the owner of an interest in the franchise and property, and requiring a transfer to him of a proper proportion of the shares of stock. The court also intimates, in the course of its opinion, that such a contract contravenes no rule of public policy, either by preventing rivalry between the parties and thus lessening competition, or otherwise (decided by the Supreme Court, December, 1897).[1] The proper remedy is declared to be an action at law to recover damages for breach of the contract, a somewhat hard case, where, as here, the plaintiff must seek relief from a defendant who is insolvent and unable to respond in damages, as is pointed out in the opinion dissenting from the decision of the Court in which two judges join.

A statue of the state of Washington provides that any mortgage of personal property shall be void as against creditors, unless it is accompanied by the affidavit of the mortgagor that it is made in good faith and without any intention to defraud creditors. In an action to foreclose a mortgage, executed by a railroad company in that state, covering all its real estate, personal property and franchises, it appeared that no such affidavit accompanied the mortgage. The constitution of Washington provides that rolling stock and other movable property of a railroad corporation shall be considered personal property. It is held that a creditor by virtue of a judgment recovered after the execution of such a mortgage is entitled to satisfaction of his judgment before the payment of the mortgage debt, to the extent of the personal property covered thereby (decided by the C. C. A., 9th Cir., October, 1897).[2] Although the United States courts have more than once held that statutes, enacted in different states relating to chattel mortgages and similar to that of Washington, do not apply to a mortgage covering personal property in connection with real estate and franchises, in each case the decision is based upon an independent statute specifically empowering railroad companies to mortgage their franchises, real and personal property as an entirety. No such statue exists in Washington. There, legislation on the subject is general, and enacted for the benefit of all corporations alike.[3] The law of this case prevails in New York.[4]

The Supreme Court of Michigan declares, with emphasis, that a railroad company is not relieved from liability for killing stock not belonging to an owner adjacent to its right of way, by permitting such an owner to put up any such fence as he may choose, because the statute requiring railroad companies to fence was adopted for the protection of employees and passengers on trains, as well as owners of stock, and maintains that it follows that the contributory negligence of the owner of the animals, in permitting them to roam at large, is not available to the company as a defense (decided by the Supreme Court, December, 1897).[5] This rule of law, as to contributory negligence and the course of reasoning through which it is reached, differs from that adopted in many states.

The Georgia statute which requires railroad companies to maintain sufficient cattle guards at crossings and at the dividing lines between the lands of adjoining owners, upon notice from such an owner, imposes no duty to maintain such guards for the benefit of anyone not the owner, whether the required notice is given or not. Accordingly, a tenant cannot recover for the destruction of his crops by hogs by reason of the absence or defective condition of such guards (decided by the Supreme Court, March, 1897; published December, 1897).[6]

In an action brought in Kentucky, to recover damages for personal injuries alleged to have been caused by the negligence of a railroad company, it appeared that the plaintiff, to avoid an obstruction of a street crossing by one of the defendant's trains, had walked around the end of the train, in the dark, and had fallen over a pile of lumber, on the defendant's land, and had broken her arm. It was contended that the company was chargeable with negligence because of its failure to keep its premises lighted. It is held that, in the absence of proof of the length of time that the cars had been on the crossing, or that the defendant did not have the right to stop its trains there, the action must fail, as on the facts shown, the relation of the plaintiff to the company was merely that of a trespasser (decided by the Court of Appeals, October, 1897).[7]

It is held in Tennessee that knowledge acquired by a conductor, while in charge of a train, of recklessness and indifference to the safety of the crew of the train on the part of the engineman is such notice to the company employing him as will render it liable to a member of the crew, for an injury, thereafter received, through such recklessness and incompetency, since the conductor is the immediate superior of the engineman, and represents the company. The fact that the conductor was not himself authorized to discharge the engineman is no defense (decided by the Supreme Court, November, 1897).[8]

[1] Hyer vs. Richmond Traction, 18 Sup. Ct., 114.
[2] Ill. Trust & Sav's B'k vs. Seattle Electric Ry., 82 Fed., 936.
[3] Hammock vs. Trust Co., 105 U. S., 77.
[4] Hoyle vs. Plattsburg & Montreal, 54 N. Y., 314.
[5] Neversorry vs. Duluth, S. S. & A., 73 N. W., 125.
[6] Fla. Cent. & P. R. R. vs. Judge, 28 S. E., 379.
[7] Eads vs. L. & N., 42 S. W., 1135.
[8] East Tenn., V. & G. vs. Wright, 42 S. W., 1064.

MEETINGS AND ANNOUNCEMENTS.

Dividends

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Maine, preferred, 3 per cent., payable March 1.

Buffalo, Rochester & Pittsburgh, preferred, 1 per cent., payable Feb. 15.

Chicago, St. P., Minn., & Omaha, common, 2 per cent., preferred, 3½ per cent., payable, Feb. 21.

Cornwall & Lebanon, 2 per cent., payable Feb. 1.

Rome, Watertown & Ogdensburgh, guaranteed, quarterly, 1¼ per cent., payable Feb. 15.

Northern Pacific, quarterly, preferred, 1 per cent., payable March 3.

Green Bay & Western, 2½ per cent., payable Feb. 15.

West Chicago Street, quarterly, 1½ per cent., payable Feb. 15.

Brooklyn City & Newtown, quarterly, 2 per cent., payable Feb. 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* meets at the House of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Chicago Electrical Association* meets at Room 7137 Monadnock Building, Chicago, on the first and third Fridays of each month, at 8 p. m. J. R. Cravath, Secretary.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Locomotive Foreman's Club* meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The *New England Railroad Club* meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *St. Louis Railway Club* holds its regular meeting on the second Friday of each month, at 3 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736–1739 Monadnock Block, Chicago.

The American Society of Irrigation Engineers.

Annual meeting will be held in Denver, Colo., on Friday and Saturday, March 25 and 26 next. John S. Titcomb, Secretary, 36 Jacobson Block, Denver, Colo.

Western Society of Engineers.

A regular meeting of the Western Society of Engineers was held in the Society Rooms, Monadnock Block, Chicago, Wednesday evening, February 2. Mr. Alfred Noble presented a paper entitled, "Some Engineering Features of the Nicaragua Canal.

Illinois Society of Engineers and Surveyors.

The thirteenth annual convention of the Illinois Society of Engineers and Surveyors was held at Peoria, Ill., Jan. 26 to 28. The opening address was delivered by the President, C. C. Stowell, of Rockford. A number of papers on drainage, water supply, paving and road making were presented and discussed, and the following new officers were installed:

President, A. D. Thompson, Peoria: *Vice-President*, W. A. Darling, Rock Island; *Executive Secretary*, Jacob A. Harman, Peoria; *Recording Secretary*, John C. Quade, Kewanee: *Trustees*, W. D. Pence, Champaign; S. S. Greeley, Chicago; C. C. Brown, Bloomington.

The convention adjourned Jan. 28, to meet in Champaign next year.

Chicago Electrical Association.

The following is the programme announced for the future meetings of the Chicago Electrical Association during the present season:

February 4. "Electricity in Ship Building," by Mr. C. C. Mattison, Engineer, Chicago Ship Building Company.
February 18. "Electricity in Medicine," by Mr. E. W. Jewell, McIntosh Battery & Optical Company.
March 4. "Relationship of the Hunter and Tesla Patents," by Mr. A. Miller Belfield, Patent Attorney.
March 18. "The Autobiography of a Piece of Wire," by Mr. C. T. Gage, Wasburn & Moen Manufacturing Company.
April 1. Special Paper to be announced later.
April 15. "The Electric Railway," by Mr. W. R. Garton, Railway Manager, Central Electric Company.
May 6. "The Enclosed Arc Lamp," by Mr. J. M. Hollister, Western Electric Company.
May 20. Annual Banquet.

The following are the officers for 1898 99: *President*, Mr. F. S. Hickok: *Vice-President*, Mr. T. G. Grier: *Treasurer*, Mr. E. J. Swartout; *Secretary*, Mr. J. R. Cravath: *Directors*, Messrs. S. G. McMeen, J. M. Hollister, and C. Wiler.

The Civil Engineers' Club of Cleveland.

The semi-monthly meeting of the Club was held in its room in Case Library Jan. 25, 1898, at 7:45 p. m., President Ritchie in the chair. Mr. Samuel T. Dodd read the paper of the evening on the subject of Power Consumption on Electric Railroads. He discussed the resistance developed by moving cars and reviewed the formulas which have been in common use to express this resistance and compared these results with a number of recent instances upon electric railroads. He concluded that modern experience shows that the old formulas, while giving results rather high at low velocities, give too small resistances at high velocities when applied to electric motors. The author also discussed the question of acceleration and the power required to bring the car to a certain maximum velocity, and the number of seconds in which this may be accomplished. He adduced instances from the practice of several of the inter urban roads about Cleveland, and showed that about 400 lbs. per ton was the maximum horizontal effort to be expected from the electric motor. The paper was accompanied with a number of diagrams and tables illustrating the subject.

The discussion was participated in by Messrs. W. H. Searles, James Ritchie, Joseph R. Oldham and Walter C. Parmley, members of the Club, also by Messrs. L. M. Sheldon and George M. Hoag, visitors. Mr. Germain, an engineer, over eighty years of age, then addressed the Club, and gave some outlines of the method by which he would utilize the current of flowing streams to obtain power for generating electricity or other purposes. In this connection he had in mind the utilization of the River Jordan, which has a rapid descent, although devoid of waterfalls at any one point.

The Engineers' Club of Philadelphia.

A business meeting of the Club will be held on Saturday, Feb. 5, at 8 o'clock p. m. The paper will be "Various Phases of Road Question," by Gen. Roy Stone, Director, Office of Road Inquiry, Department of Agriculture.

The annual meeting was held Jan. 15, President Joseph T. Richards in the chair, 75 members and visitors present.

Mr. Joseph T. Richards, retiring President, called attention to the consideration which had been given the question of better house accommodations during the year, and expressed the belief that the time was not far off when a federation of Philadelphia scientific societies will be lodged in a building worthy of its tenants.

He then described the year's progress in engineering work in and about Philadelphia, including the extraordinary growth in building; the improvement of our harbor, begun in June, 1896, and just completed; the establishment of the Philadelphia Commercial Museum, whose agents are scattered over the whole commercial world; the military strengthening of our country, as evidenced by improvements at and near Fort Delaware; the improvements in ocean travel, to which the companies terminating at our harbor and the shipbuilders in our neighborhood have largely contributed, and the increase in the mileage of our railroads, which, while not so great as in previous years, still keeps the United States ahead of all other countries, and makes her railroad mileage nearly equal that of all other parts of the world combined. The achievements in bridge building and in the movement of the entire or large parts of bridges were commented upon and illustrated. The extension in the use of compressed air as a motor was noted and illustrated by its recent application in the post-offices of other cities following the example of the postal service in Philadelphia, and by its very important use in pneumatic locks for canals, which may solve the question of how to open a deep and inexpensive waterway from Chicago and Duluth to the sea. The work of depressing the railroad tracks through our own and other large cities in subways has been continued, to facilitate travel and avoid danger.

The President declared the following elected to the offices named:

President, L. Y. Schermerhorn; *Vice President*, Wm. C. L. Eglin; *Secretary*, L. F. Rondinella; *Treasurer*, George T. Gwilliam; *Directors*, Richard L. Humphrey, C. H. Ott, Edwin F. Smith.

The retiring President then introduced the newly-elected President, Mr. L. Y. Schermerhorn, who, in taking the chair, thanked the Club for the honor conferred upon him, and made some suggestions as to the work of the Club for the coming year.

PERSONAL.

—Mr. W. B. Ruggles, formerly Chief Engineer of the Cincinnati, Portsmouth & Virginia, with headquarters at Portsmouth, O., resigned on Jan. 1.

—Mr. A. T. W. Pritchett, Auditor of the Wiggins' Ferry Company, with headquarters at St. Louis, Mo., has resigned. Resignation takes effect Feb. 1.

—Mr. G. J. Harris, heretofore Agent at Chicago for the Ogdensburgh Transit Company (Central Vermont), has resigned. Resignation took effect Jan. 15.

—Mr. Thomas P. Nichols, who had charge of the Traffic Departments of the Gulf & Interstate Railway of Texas, has resigned; resignation took effect Feb. 1.

—Mr. Arthur S. Potter, Vice-President and General Manager of the Omaha Bridge & Terminal Railway Company at Omaha, Neb., has resigned to engage in other business.

—Mr. D. D. McTavish, General Freight and Passenger Agent of the St. Catharine's & Niagara Central, with headquarters at St. Catharine's, Ont., has retired from railroad service.

—Mr. W. C. Halliday, heretofore Assistant Chief Engineer of the Eastern Division of the Lake Shore & Michigan Southern, with headquarters at Dunkirk, N. Y., has resigned.

—Mr. W. H. Taylor, heretofore Traveling Freight Agent of the Gulf, Colorado & Santa Fe, with headquarters at Dallas, Tex., resigned his office on Jan. 15. He is now connected with the Houston, East & West Texas.

—Mr. W. C. Earnest, heretofore Contracting Agent of the Canada Southern, which is a part of the Michigan Central, with headquarters at Cincinnati, O., has resigned to accept a similar position with the Canadian Pacific.

—Mr. George H. Pegram, Chief Engineer of the Union Pacific, with headquarters at Omaha, Neb., has resigned; resignation to take effect at once. He is to become Consulting Engineer of the Manhattan Railway, of New York City.

—Mr. Harry Lee Wyatt, Foreign Freight Agent of the Baltimore & Ohio, with headquarters at Chicago, Ill., has resigned to become General Western Agent of the new Fast Freight Line, the North Shore Dispatch. (See these columns for last week.)

—The Agency heretofore operated as a joint office of the Blue Line and Canada Southern Line at St. Louis has been discontinued and separate agencies established. Mr. E. B. Smith has been appointed Agent for the Blue Line and Mr. B. H. Coyle for the Canada Southern Line.

—Mr. Alexander H. Peacock, who was one of the incorporators of the Lancaster & Reading (narrow gage) road, and its President in 1880, died at Lancaster, Pa. Jan. 26, at the age of 77. Mr. Peacock was also a Director and Assistant Manager of the Penn Iron Works at Lancaster.

—Mr. Charles O. Scull, heretofore General Passenger Agent of the Pittsburgh & Western at Allegheny, Pa., and recently resigned, is reported to have charge of the Railroad Department of a Baltimore Guarantee & Surety Company. His address is 414 West Fayette street, Baltimore, Md.

—Mr. F. B. Drake, General Manager of the Cincinnati & Northern, formerly the Cincinnati, Jackson & Machinaw, with headquarters at Van Wert, O., has resigned. Mr. Drake takes this step owing to the fact that the road has not been extended in its scope, as had been understood.

—Mr. James McCrea, of Pittsburgh, Vice-President of the Pennsylvania Company, was on Feb. 1 elected a Trustee of the University of Pennsylvania, to fill the vacancy caused by the death of Mr. John Scott. Mr. McCrea is the first Trustee of the University that has been elected outside of Philadelphia.

—Mr. William McMeekin, contractor and builder, died Feb. 1 at his home in Newburgh, N. Y., from heart disease, aged 56. He built a large section of the elevated tracks of the West Shore Railroad through Newburgh, and the Quartermaster's storehouse and the building for cadets and officers' quarters at West Point.

—Mr. H. Collbran, formerly President of the Midland Terminal Railway, and now in charge of the construction of the Seoul Chemulpo Railway in Korea, has appointed E. E. Rittenhouse, formerly Assistant Superintendent of the Colorado Midland, to a position to superintend the setting up of locomotives. Mr. Rittenhouse sailed for Korea from San Francisco Jan. 25.

—Mr. W. E. Arnold, General Traveling Passenger Agent of the Ocean Steamship Company, with headquarters in New York City, has resigned. The resignation took effect Jan. 31. He will be succeeded by C. B. Walworth, heretofore Eastern Passenger Agent. Mr. Arnold will hereafter be connected with John Medole & Son, a printing and binding concern of New York City.

—Mr. Charles S. Nason, formerly Mechanical Superintendent of the Bangor & Aroostook, died at his home in Bangor, Me., Jan. 28. He was, at one time, Mechanical Superintendent of the Bangor & Piscataquis, and when that road was leased by the Bangor & Aroostook he was made Mechanical Superintendent of both roads, and remained as such until he retired from active work, in 1895.

—Mr. Charles Craig, heretofore General Eastern Passenger Agent of the Baltimore & Ohio, with headquarters in New York, died at his home in New York City, Jan. 31, at the age of 60. Mr. Craig had been at different times Ticket Agent in New York City for the Erie, and General Eastern Passenger Agent of the company. In July, 1880, he was appointed General Eastern Passenger Agent of the Baltimore & Ohio.

—Mr. J. C. Aimes, President of the Lake Michigan Car Ferry Transportation Co., has resigned to become United States Marshal of the Northern District of Illinois. Mr. A. H. Crocker, Superintendent of the Wisconsin & Michigan, will hereafter have charge of the operation of the Lake Michigan Car Ferry Transportation Company, which is controlled by the Wisconsin & Michigan, in addition to his present duties. His headquarters are at Peshtigo, Wis.

—Mr. Alfred W. Sumner, heretofore Purchasing Agent of the Pennsylvania, died at his home in Mooristown, N. J., Jan. 29, at the age of 57. He was for several years Purchasing Agent of the Northern Central at Baltimore, Md., and remained in this position until the road was consolidated with the Pennsylvania, when he went to Philadelphia as Assistant to the Purchasing Agent. In 1893 he was made Purchasing Agent of all the lines east of Pittsburgh and Erie, with headquarters at Philadelphia.

—Mr. James F. Smith, at one time President of the East Pennsylvania, now the Philadelphia & Reading, died at his home in Reading, Pa., Jan. 31, at the age of 84. In 1831 Mr. Smith was Assistant Civil Engineer of the Allegheny Portage Railroad, now the Pennsylvania, and in that capacity assisted in locating this road across the Allegheny Mountains. In 1863 he was with the Catawissa, now also a part of the Philadelphia & Reading, and assisted in the location and construction of that road. In 1840 Mr. Smith was cashier of the Eastern Division of the New York & Erie, now the Erie, with headquarters at Piermont, N. Y. He was Engineer of the Lower Division of the old Schuylkill Navigation Company in 1843, and Chief Engineer of the system from 1850 to 1876. During the latter years of his active business life he was Consulting Engineer of the Philadelphia & Reading.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio Southwestern.—E. C. Murray has been appointed Advertising Agent, with headquarters at Cincinnati, O.

Boston & Maine.—F. M. Encore, heretofore Chief Clerk in the Car Service Department, has been appointed Acting Car Accountant, with headquarters at Lincoln, Mass., succeeding Frank W. Smith.

Canada Atlantic.—George J. Harris has been appointed General Western Traffic Agent, with headquarters at 6 Sherman street, Chicago, Ill.

Canadian Government Railway System.—James Hardwell has been appointed Division Freight Agent, with headquarters at Montreal, Que., in charge of all freight matters in connection with the system west of and including Dalhousie, N. B.; he is also to act as Foreign Freight Agent. Owen Cameron has been appointed Freight Claim Agent, with headquarters at Moncton, N. B. J. Campbell has been appointed Car Accountant, with headquarters at Moncton. A. W. Morrison has been appointed General Baggage Agent, with headquarters at Moncton. H. H. Schaeffer has been appointed Weighing Inspector, and J. F. Nelles, Assistant Weighing Inspector, with headquarters at Moncton. The appointments take effect on the system Feb. 1.

Central of Georgia.—James G. Carlisle, heretofore Soliciting Freight Agent, with headquarters at Macon, Ga., has been appointed Traveling Passenger Agent, with headquarters at the same place, succeeding W. P. Dawson, resigned. Appointment took effect Feb. 1.

F. J. Robinson, heretofore City Ticket Agent at Atlanta, Ga., has been appointed Traveling Passenger Agent in the Northwest, with headquarters at 205 Clark street, Chicago, Ill.

Central Vermont.—J. J. Young, heretofore Cashier at St. Albans, Vt., has been appointed Agent of the Ogdensburg Transit Company, at Chicago, succeeding G. J. Harris, resigned. The appointment took effect Jan. 15.

Chicago & Erie.—J. R. W. Davis, heretofore Assistant Engineer on the Delaware Division of the Erie, has been appointed Roadmaster of the Chicago & Erie, with headquarters at Huntington, Ind. Appointment took effect Feb. 1.

Chicago & Northwestern.—H. W. Battin, heretofore Division Engineer of the Madison Division, with headquarters at Baraboo, Wis., has been appointed Assistant Superintendent of the Madison Division, with headquarters at the same place, succeeding W. E. Morse, promoted. (See this column for last week.)

Chicago, Burlington & Quincy.—Frank Patterson, of Chicago, has been appointed Resident Engineer, and Sam Neely, of Washington, D. C., has been appointed his Assistant on the following lines: Hannibal & St. Joseph; St. Louis, Keokuk & Northwestern; Kansas City, St. Joseph & Council Bluffs; Chicago, Burlington & Kansas City, which are parts of the Chicago, Burlington & Quincy. The headquarters of both are to be at Hannibal, Mo. W. A. Lalor has been appointed Assistant General Passenger Agent, with headquarters at Chicago, Ill.

Chicago Great Western.—P. N. Seymour, recently Commercial Agent of the Baltimore & Ohio, has been appointed General Western Agent of the Chicago Great Western, with headquarters at Butte, Mont., succeeding Samuel J. Barclay, whose resignation was reported in these columns last week.

A new office of Traveling Freight Agent for Utah and Wyoming is to be opened at Salt Lake City, Utah. General Agent John K. McGowan is now in Salt Lake City making arrangements to open the office. No appointment has as yet been made.

Cincinnati, Portsmouth & Virginia.—John A. Clark, heretofore Division Engineer of the Kenova Division of the Norfolk & Western, has been appointed Engineer of Maintenance of Way, with headquarters at Cincinnati, O.

Cornwall.—At a meeting of the stockholders of this company, held at Lebanon, Pa., Jan. 25, B. H. Buckingham was elected President.

Detroit, Toledo & Milwaukee and Detroit & Lima Northern.—A. C. Whittemore has been appointed Traveling Freight Agent for the territory west of Chicago and Milwaukee, with headquarters at Milwaukee, Wis.

El Paso & Northern.—W. C. Hollister, formerly of the contracting firm of J. W. Thompson, of St. Louis, Mo., has been appointed Superintendent in charge of operation of the El Paso & Northern, with headquarters at El Paso, Tex.

Fort Wayne & Jackson.—At a meeting of the stockholders of this company, which is a part of the Lake Shore & Michigan Southern, held at Jackson, Mich., Jan. 25, William L. Sanford was elected Secretary, succeeding W. D. Searles.

Grand Rapids & Indiana.—A. M. Nichols has been appointed Traveling Passenger Agent, with headquarters at Grand Rapids, Mich., succeeding R. E. Casey.

Gulf & Interstate Railway of Texas.—James Hickey has been appointed Master Mechanic, with headquarters at Beaumont; T. J. Ray has been appointed Roadmaster, with headquarters at Beaumont, Tex. The appointments effective Jan. 15.

Gulf, Colorado & Santa Fe.—J. R. Dillon has been appointed Traveling Freight Agent, with headquarters at Dallas, Tex., succeeding W. H. Taylor, resigned.

Houston, East & West Texas.—W. H. Taylor, heretofore Traveling Freight Agent of the Gulf, Colorado & Santa Fe, has been appointed Commercial Agent of the Houston, East & West Texas and Houston & Shreveport with headquarters at Kansas City, Mo. The appointment took effect Jan. 15.

Iowa Central.—S. G. Lutz has been appointed Assistant General Freight Agent, with headquarters at Marshalltown, Iowa. Appointment effective Feb. 1.

Lackawanna Line.—J. H. Crawford, heretofore Agent of the Lackawanna Line at St. Louis, Mo., has been appointed General Manager, succeeding W. H. Smith, resigned. Appointment effective Feb. 1.

Mississippi, Hamburg & Western.—At the annual meeting of this company, held at Hamburg, Ark., Jan. 27, Mr. L. A. Cole, of New York, was made President, succeeding J. M. Parker, who has been appointed General Manager. Mr. Parker's headquarters are to be at Hamburg, Ark.

Missouri, Oklahoma & Texas.—At a meeting of the Directors of this company, held at Tecumseh, Okla., Jan. 19, the following officers were elected for the ensuing year: President, A. T. Foster; Vice-President, Samuel Clay; Treasurer, Wright Christian; Secretary, E. B. Murray; Chief Engineer, D. T. McDonough. (See these columns for Jan. 14.)

Newark, Somerset & Straitsville.—At the annual meeting of this company, which is a part of the Baltimore & Ohio, held in Newark, O., Jan. 26, the following Directors were elected, to serve one year: David Lee, Zanesville, O.; R. T. Devries and J. D. Culbertson, Wheeling, W. Va.; Lincoln Richards and Franklin Ames, Chicago, Ill.; J. M. Graham, Newark, O; John Reed, Mansfield, O.; J. R. McCourtney, Bellaire, O.; P. E. Werner, Akron, O. At a meeting of the Directors held later the following officers were elected: President, David Lee; Secretary and Treasurer, P. E. Sneed. Garrett, Ind.

New York Central & Hudson River.—A. Wilber, heretofore Roadmaster of the Mohawk & Malone, has been appointed General Inspector of Bridges and Masonry on the main line between Buffalo and Mott Haven. Appointment took effect Feb. 1.

Norfolk, Willoughby Spit & Old Point.—At the annual meeting, held at Norfolk, Va., Jan. 21, M. W. Burk was elected Vice-President, and W. C. Cobb was elected Secretary and Treasurer.

Omaha & Council Bluffs Ry. & Bridge Co.—At the annual meeting of this company, held Jan. 11, at Council Bluffs, Iowa., the following officers were elected: President, N. W. Wells; Vice-President, J. J. Brown; Treasurer, J. H. Millard; Secretary, C. T. Stewart; General Superintendent, D. S. Dimmock; Assistant General Superintendent and Electrician, I. Lovett; Superintendent of Motive Power, W. B. Tarkington. The headquarters of all are at Council Bluffs, Iowa.

Pittsburgh & Lake Erie.—At a meeting of the Board of Directors, held at Pittsburgh, Jan. 25, J. M. Schoonmaker was elected Vice-President and General Manager. G. M. Beach, heretofore General Superintendent, was appointed Assistant General Manager, and J. B. Yohe, heretofore Superintendent, was appointed General Superintendent, succeeding Mr. Beach. The headquarters of all are at Pittsburgh, Pa.

Pittsburgh & Western.—Though it has not been announced officially, Charles W. Bassett has been appointed General Passenger Agent at Allegheny, Pa., succeeding Charles O. Scull, who recently resigned.

Rio Grande Western.—W. C. McBride, General Freight Agent, hereafter will perform the duties of General Passenger Agent, succeeding E. S. Blair in addition to his present duties.

St. Catharine's & Niagara Central.—W. N. Warburton, heretofore General Agent of the Toronto, Hamilton & Buffalo, has been appointed General Freight and Passenger Agent, succeeding D. D. McTavish, recently re-

signed. His headquarters are to be at St. Catharine's, Ont.

Seaboard Air Line.—H. I. Norvell, heretofore Contracting Agent at St. Louis, Mo., has been appointed Commercial Agent, with headquarters at 371 Broadway, New York; J. G. Cantrell, formerly Soliciting Freight and Passenger Agent at Nashville, Tenn., has been appointed General Western Agent, with headquarters at 407 Merchant's Exchange, St. Louis, Mo., succeeding J. I. Norvell, promoted; F. B. Teachout has been appointed Soliciting Freight and Passenger Agent, with headquarters at Nashville, Tenn., succeeding Mr. Cantrell. These appointments are effective Feb. 1. Mr. I. K. Dye, having found his duties of Commercial Agent of both the Ohio River and the Seaboard Air Line are to some extent conflicting, he has withdrawn from the service of the Seaboard Air Line, and that office at Chattanooga Tenn., has been abolished.

Seattle & International.—President John H. Brant, Secretary and Treasurer Charles Powers, and M. S. Patton, Chairman of the Board of Directors, have resigned, and the Seattle & International, as reported in another column, will hereafter be controlled by the Northern Pacific. President C. S. Mellen, of the Northern Pacific, has been made Chairman of the new Board of Directors of the Seattle & International, and has appointed W. G. Pierce, Assistant Superintendent of the Northern Pacific, to take charge of the Seattle & International, his title being Agent of the President.

Stockton & Tuolumne.—The officers of this newly incorporated company, referred to in another column, are as follows: President, Annie Kline Rikert, San Francisco; Vice-President, Jabish Clement, San Francisco; Treasurer, Maggie Downing Brainard, San Jose, Cal; Secretary, Robert S. Clarke, Jamestown, Cal. The principal office is at San Francisco, Cal.

Toledo, St. Louis & Kansas City.—R. S. Saupe, of St. Louis, Mo., has been appointed Traveling Passenger Agent, with headquarters at Los Angeles, Cal.

Toronto, Hamilton & Buffalo.—The office of General Agent, formerly occupied by W. N. Warburton, who resigned on Dec. 1, has been abolished.

Union Pacific.—Offices are to be opened Feb. 1 at 120 Broadway, New York. Vice-President O. W. Mink will have charge, as reported in the *Railroad Gazette* Dec. 31.

White Line Central Transit Co.—W. M. Pennington, heretofore General Traveling Agent of the company, operating over the New York Central & Hudson River has been appointed General Southern Agent, with headquarters at Memphis, Tenn., succeeding F. W Thomas, resigned.

RAILROAD CONSTRUCTION,
Incorporations Surveys, Etc.

Canadian Roads.—A contract is reported to have been signed between the firm of Mackenzie & Mann, of Toronto, and the Canadian Government, for an all-Canadian route to the Klondike. The provisions are that within six weeks from Jan. 27, the date of signing the contract, a sleigh road shall be completed from the mouth of the Stickeen River to Teslin Lake, with suitable stopping places and shelters at intervals of 25 miles. It is further provided that a railroad shall be built from Glenira, or Telegraph Creek, on the Stickeen River, north about 150 miles to Teslin Lake. This road to be completed and in operation by Sept. 1 next. The contracting company is further required to provide a line of steamers from the terminus of this road through Teslin Lake, Hootalinqua River, Lewis River and the Yukon to Dawson City. The Government grants no cash subsidy, but gives 25,000 acres of land in the Yukon district for each mile of railroad built. This land is to be laid off in blocks of three miles by six, the government reserving each alternative lot. All the lands granted are to be subject to a gold royalty of one per cent. The government requires a deposit of $250,000 as security for the faithful discharge of the terms of the contract. Along the steamship line from Teslin Lake to Dawson City the government reserves a strip of land on each bank for the public use, and insures the right of navigation of all steamers. After building and operating 10 miles of the railroad the contractors are to have the right of selecting 90,000 acres of land, and similar rights are given when each 10 miles of the railroad are built and operated The rates are to be fixed first by the Privy Council; at the end of four years they are to be reduced 25 per cent., and at the end of seven years reduced by another 25 per cent., and at the end of 10 years they become subject to the General Railway Act. By the terms of the contract, the government prohibits for five years any other railroad from Alaska to the Yukon, and for 10 years any other railroad from the British Columbia coast to the Yukon. This road may be continued southward from the Stickeen River to an ocean port in British Columbia to be selected by the government and the contractors will have the first option on this road. When the road from the Stickeen River to Teslin Lake is completed, the trip to Dawson City may be made all the way by railroad and steamers. From Victoria, B. C., steamers run to Fort Wrangell, on the Stickeen River, where baggage and freight will be transshipped to river steamers and conveyed to the railroad wharf up the river; thence by railroad to Lake Teslin and from Lake Teslin via Selkirk and Stewart River to Dawson City.

Catskill & Tannersville.—It is officially stated that this road is to be extended about six miles to connect with the Otis Elevating Railway. Bonds for this extension are to be guaranteed by the Catskill Mountain Co., whose Board of Directors has passed a resolution guaranteeing the same. The necessary money is nearly all subscribed, and it is expected that the road will be completed in May. Through the Catskill Mountain the Otis Elevating and the Catskill & Tannersville railroads direct connection is made from Catskill, N. Y., to the heart of the Catskill Mountains.

Center & Tenaha.—This company has been incorporated in Texas with a capital stock of $12 000 to build a line in Shelby County from Tenaha, a point on the Houston, East & West Texas, south 11 miles to Center. The incorporators are: W. J. Leister, F. W. Flambro, B F. Bridges, A. B. Knight, S. T. Fleshman, E. H. Hearne, J. C. Rogers, John Sanders, J. H. Armstrong, R. L. Parker and A. R. Chandler, all of Shelby County.

Central of Georgia.—The report given by some of our contemporaries that this company is preparing to build a Belt Line in Atlanta is incorrect. A letter from an officer of the company states that the company, some years ago, purchased property for the building of such a Belt Line, but no work has as yet been done, and it has not been determined whether or not the property will be utilized.

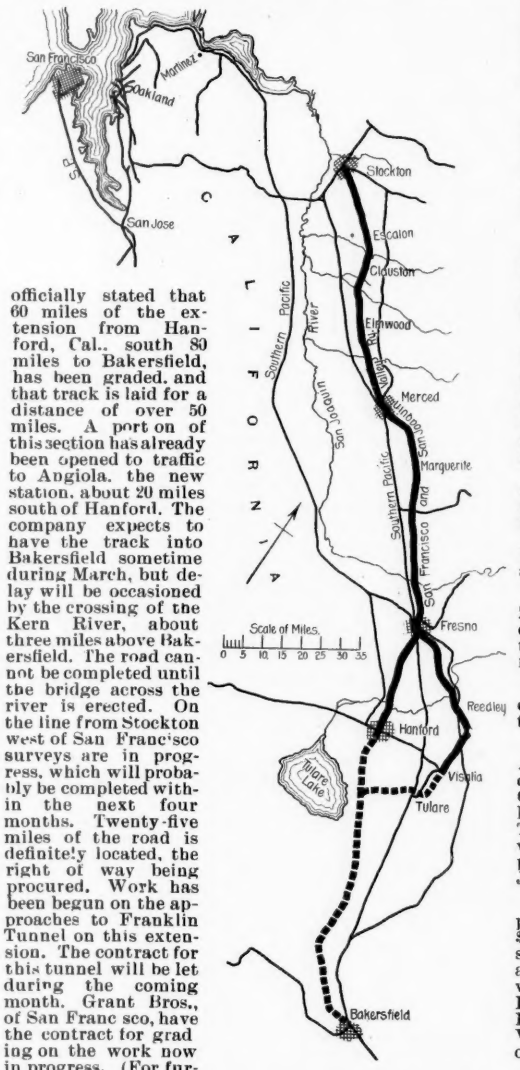
Chicago Great Western.—It is reported that this company made an offer to the citizens of Hanover, Ill., to build a spur of three miles from North Hanover to that city and that the proposition is now under consideration.

Chilkoot Railroad & Transportation Co.—It is reported that the Aerial Cableway, seven miles long, from Canon City over Chilkoot Pass to Crater Lake, has been completed. This, with the railroad already completed from Dyea, Alaska, eight miles, gives a complete line over the worst portion of that route to connect with the waterway down the Yukon to the gold fields. (For further description of this cable see the *Railroad Gazette* for Dec 24)

Choctaw, Oklahoma & Gulf.—It is reported that surveys have been ordered for an extension of this line from Shawnee, Okla., north about 60 miles through Chandler to Stillwater. It is stated that the rails, bridges and other materials have been purchased and will be on the ground in a few weeks. It is also stated that this company is making operations to extend this line from Wister, I. T., east 6½ miles to a connection with the Kansas City, Pittsburgh & Gulf.

Cleveland & New Castle.—This company was incorporated in Ohio, Jan. 26, with a capital stock of $10,000 to build a line from Cleveland, O., east through the counties of Cuyahoga, Summit, Portage, Trumbull and Mahoning to the Pennsylvania state line, about 70 miles. The incorporators are W. B. Sanders, J. H. Dempsey, W. B. Whiting, Andrew Squire and S. M. Snider.

San Francisco & San Joaquin Valley.—It is officially stated that 60 miles of the extension from Hanford, Cal., south 80 miles to Bakersfield, has been graded, and that track is laid for a distance of over 50 miles. A portion of this section has already been opened to traffic to Angiola, the new station, about 20 miles south of Hanford. The company expects to have the track into Bakersfield sometime during March, but delay will be occasioned by the crossing of the Kern River, about three miles above Bakersfield. The road cannot be completed until the bridge across the river is erected. On the line from Stockton west of San Francisco surveys are in progress, which will probably be completed within the next four months. Twenty-five miles of the road is definitely located, the right of way being procured. Work has been begun on the approaches to Franklin Tunnel on this extension. The contract for this tunnel will be let during the coming month. Grant Bros., of San Francisco, have the contract for grading on the work now in progress. (For further description of this road see this column for Nov. 5 and Dec. 10.)



Line of the San Francisco & San Joaquin Valley Railroad.

Deepwater Railway.—This company was incorporated in West Virginia, Jan. 25, to build a line from Deepwater, on the Kanawha & Michigan, up Lower Loup Creek and across the mountains to Glenjean, on Upper Loup Creek, about 60 miles. It is proposed to utilize the railroad already constructed and in operation on Loup Creek. The line will be used to develop a tract of 26,000 acres of coal and timber lands owned by Abram S. Hewitt and others of New York. The incorporators are W. N. Page, Raleigh; C. Taylor, Ansted, W. Va.; G. W. Imboden, Fayetteville, W. Va.; Joseph Burley, Fire Creek, W. Va, and R. S. Ransom, of Staunton, Va.

Greenbrier.—Rhinehart, Gooch, Carpenter & Shepherd, of Stanton, Va., are reported to have obtained the contract for building this road from White Sulphur Springs, W. Va., a point on the Chesapeake & Ohio, northeast via Avalon, Driscoll and Frost to the Forks of the Greenbrier River near Traveler's Repose. H. S. Simms, of Huntington, Va., is President. (See this column for Nov. 26 and Dec. 24)

Greigsville & Pearl River.—The New York State Railroad Commission has granted this company permission to build this line from Greigsville, N. Y., northwest about eight miles to Pearl Creek. Charles G. Yates, of Rochester, N. Y., is among the Directors.

Gulf, Colorado & Santa Fe.—The House Committee on Indian Affairs has reported favorably the bill to allow this company to build an extension from the main line at Daugherty, I. T., east into the next township, to give easy communication to the asphalt deposits. Work must be completed within three years. The bill also provides that the Denison & Northern may sell its title to that portion of the right of way located in Indian Territory, which may be on the route selected by the Gulf, Colorado & Santa Fe for its proposed extension. The Denison & Northern is a line chartered in Texas, whose present northern terminus is Daugherty, I. T.

Kansas City, Pittsburgh & Gulf.—It is reported that this company has decided to run a line from Port Arthur south four miles to Taylors' Bayou, where a temporary wharf will be built for exporting goods. Work is now in progress on the canal to Port Arthur, which is to be completed, according to contract, by June 1.

Matamoras & New York.—The New York Railroad Commission has refused the permission of this company to build its proposed line from Port Jervis, N. Y., across the Delaware River to Matamoras, Pa. This company was incorporated in New York, Dec 7. A. E. Lethbridge, New York, is one of the Directors.

Mexican Northern.—Official denial is made of the report, referred to in this column for Jan. 14, that this company is to build an extension from Sierra Mojada north toward the Texas line. No such extension is contemplated.

Milford, Matamoras & New York.—The New York State Railroad Commission has granted the application of this company to build a line from a connection with the Erie road at Port Jervis across the Delaware River to a point in Pennsylvania, near Matamoras This company was incorporated in New York in June L. Marthemont, of Milford, Pa., is one of the Directors.

Nebraska, Kansas & Gulf.—This company was incorporated in Kansas, Jan. 29, with a capital stock of $26,000,000, to build a line from Niobrara River in Northern Nebraska south through Nebraska, Kansas, Oklahoma and Texas to the Gulf of Mexico. The Directors are James McKinstry, Hutchinson, Kan.; John Martin, Topeka, Kan; John P. Briston, Little River, Kan.; Francis D. Peck, William H. Dennison, Edward Roemer, and Robert G. Wick, New York City.

New England.—Senator Platt has introduced a bill in the United States Senate granting right of way through the Naval Station opposite New London, Conn., for the proposed Norwick & Worcester extension from Allyn's Point south six miles to Groton, which must be completed within three years after the passage of the bill. (See this column for Jan. 21.)

New Orleans & Oklahoma City.—This company was incorporated in Oklahoma City, Jan. 29, with a capital stock of $24,000,000, to build a road from Medford, Okla., through Oklahoma City, to Sherman, Tex. The Directors are H. Overholser, D. C. Lewis, S. A. Stewart, C. G. Jones and Ex-Gov. W. C. Renfrow.

New Roads.—John Seamann, President of the Sheboygan Electric Railroad, is reported to have made a proposition to build a steam railroad from Sheboygan west about 10 miles to Plymouth, where connection will be made with the Chicago, Milwaukee & St. Paul. The line will be used as a steam road for freight with an electric system for passenger transportation. Mr. Seamann asks for $45,000 from the city of Sheboygan.

E. M. Tutwiler, of Blossburg, Ala., is reported to have advertised for bids for one-half mile of railroad to connect the Southern railroad at that point with a new mine about to be opened.

It is reported that James A. Ware, of White Castle La., will build about five miles of narrow gage road to a sugar plantation.

Northern Pacific.—It is reported that Geiger & Zabriskie have obtained the contract for building the extension of this road to Lewiston, Id., 20.6 miles, and that work is to be begun immediately. (See this column for Jan. 21.)

Ohio River & Charleston.—It is reported that this company proposes, during the coming year, to extend this road from Gaffney to Spartanburg, S. C., 20 miles.

Omaha Northern.—The House Committe on Indian Affairs has reported favorably on the bill, granting this company right of way to build a railroad across the Omaha and Winnebago Indian reservations in Nebraska, and to establish two stations on the reservations. This line is projected to run from Omaha, Neb., northwest up to the Missouri Valley, about 140 miles to a point opposite Yankton, So. Dak. (See this column for July 30.)

Philadelphia & Eastern.—This company was incorporated in Pennsylvania, Jan. 31, with a capital stock of $250,000 to build a line from Fox Chase, on the outskirts of Philadelphia, northeast 20 miles through Philadelphia and Bucks counties to a point on the Delaware River opposite Trenton, N. J. The Directors are Lamar J. Ridge, President; John S. Hoffman, J. T. Ridge, Albert W. Margerum, Clarence Hampton, William Tillver and Jefferis C. Melvin. The principal office is Philadelphia.

St. Louis & San Francisco.—According to reports contracts have been let for building the extension of this road from Sapulpa, I. T., west about 75 miles to Guthrie, Okla. (See this column for Nov. 19.

San Antonio, Llano & Northern.—It is reported that surveys are in progress on this proposed line from Strawn, in Palo Pinto County, Tex., a point on the Texas Pacific, south about 45 miles to Comanche on the Fort Worth & Rio Grande. It is understood that arrangements have been completed for building the road.

Santa Fe, Prescott & Phœnix.—It is reported that this company has decided to build an extension from Prescott, Ariz., east about 26 miles into the Big Bug Mining District. This line extends from Ash Fork, Ariz., a point on the Atchison, Topeka & Santa Fe, south 197.6 miles to Phœnix. It was completed March 13, 1895.

Southern.—It is reported that surveys have been completed and contracts are about to be let for an extension of this road from Leeds, Ala., to the iron ore beds of the Sloss Iron & Steel Company, eight miles.

Stockton & Tuolumne.—It is officially stated that this company, whose incorporation was noted in this column Jan. 14, is to build a road from Stockton, Cal., nearly due east through Copperopolis and Sonora to Summersville, about 35 miles. Only preliminary surveys have as yet been made, but the company is assured that the selected route is entirely practicable, and that the road will be well under way before spring is fairly opened. The officers are given in another column.

Tacoma & Columbia River.—It is reported that contracts have been let to D. M. Riddell for six miles of the extension of this road south from Lake Park, Wash., to The Dalles, Ore., nearly 200 miles. (See this column for Nov. 12 and 26.)

Texas Trunk.—It is officially stated that this com-

pany is relaying ten miles of its line with 65.5-lb. steel rails to replace 50-lb. iron rails. This is a narrow gage line from Dallas, Tex., to Cedar, 51.68 miles.

Union Pacific.—The new Union Pacific Company has been incorporated in Nebraska, California, Wyoming and Utah. The capital is placed at $136,000,000. At midnight of Jan. 31 the receivership of the old company terminated and formal notice was given to all employees that the property had been turned over to the new company. Special Master D. Cornish gives notice that he will pay the old Union Pacific first mortgage 6 per cent. bonds at the office of the Mercantile Trust Company, New York.

Vining & Coleman.—It is reported that grading has been begun on this road from a point on the Gulf, Colorado & Santa Fe, six miles south of Coleman, Tex., to the Vining mines, on the Colorado River. Contracts have been closed for the rails and ties. G. W. Sweed, of Austin, Tex., is Chief Engineer. (See this column for Dec 31.)

Virginia, Fredericksburg & Western.—It is reported that financial arrangements have been completed for issuing bonds to build this road from Millenbeck, Va., on the lower Rappahannock River, along the northern neck of Virginia to Davis, Tucker Co., W. Va. Charles H. Gibson, of Easton, Md., is President of the company.

Washington & Franklin.—This company was incorporated in West Virginia, Feb. 1, to build a line from a point on the Baltimore & Cumberland Valley extension of the Western Maryland to Cherry Run, nine miles. The incorporators are Dr. I. N. Snively, Waynesboro; S. S. Wingert, Five Forks; Dr. Joseph L. Snively, Shady Grove.

Western Maryland.—It is reported that surveys have been begun on a cut-off from a point near Chambersburg, Md., to Hagerstown. It is stated that by the cut-off eight miles will be saved besides heavy mountain grades.

Electric Railroad Construction.

Baltimore, Md.—The Consolidated Railway Co. has been granted a privilege by the City Council to lay additional tracks in Gilmore and Schroeder streets.

The Central Passenger Railway Co. has again begun work on its extension in Lower Canton. The work has been stopped owing to the opposition of the Philadelphia, Wilmington & Baltimore and the Baltimore & Ohio.

Boston, Mass.—The Boston Elevated Railway Co. has taken favorable action on the petition received from citizens in Blue Hill Avenue District, and which was strongly endorsed by Mayor Quincy, for an extension of the electric road on Blue Hill Avenue Boulevard beyond the present terminus.

Chicago, Ill.—Articles of incorporation of the Cicero & Harlem Railway Co., were filed Jan. 28; capital $1,000,000. The first Board of Directors named consists of D. H. Louderback, Benjamin C. Stidger, Charles V. Weston, J. Charles Moore and Charles N. Whitehead. The company proposes to build a line of railroad from the east line of the town of Cicero, thence in a westerly direction to the west line of Cook County, and such branch lines as the company may need.

The Chicago & Des Plaines Valley Electric Railway Co. has filed articles of incorporation, capital $1,000,000. Incorporators Henry G. Foreman, Clayton E. Crafts and Charles D. Evans, of Chicago; Philip H. Gray and William M. Hulbert of Maywood.

Denver, Col.—The Golden Circle Railroad Co., which is building an electric railroad to make a circuit of mining towns in the Denver and Cripple Creek district, with a capital of $500,000 has five miles of the road now under construction. S. T. Smith is President.

Detroit, Mich.—The Rapid Railway Co. has announced that it will extend its road from Mt. Clemens to Port Huron. Such a road, if built, would parallel the Grand Trunk from Detroit to Port Huron.

Fairmount, W. Va.—The Fairmount Electric Railway Co. has been chartered to build an electric railroad through the counties of Marion, Monongahela and Harrison. Among the incorporators are: John B. Crane, Charles E. Manley, A. Howard Fleming and Owen S. McKinney, of Fairmont, and Thomas W. Fleming of New York.

Fostoria, O.—The Tiffin & Fostoria Electric Railway has applied to the City Council of Fostoria for a franchise to build a loop about the city and also asks for an extension of the time specified for this road to be finished. This loop will give the company an outlet to Bowling Green and Findlay.

Irwin, Pa.—The McKeesport & Irwin Street Railway Co., has been incorporated with a capital stock of $120,000, $12,000 paid in. The company proposes to build an electric railroad from Irwin to McKeesport. John George, C. R. Frichtman and W. W. George, of Irwin, Directors.

La Grange, Ill.—The La Grange, Warrenville & Fox River Electric Railroad Co. has been incorporated, capital, $100,000. The incorporators are: George W. Waite, A. C. Allen, M. C. Covell, A. H. Kerman, Frederick Paulsen, J. W. Krueger and Edward S. Ely, La Grange; James M. Vallette, B. B. Boecker, I. N. Murray, Willard Scott, George Remps, C. L. Schwartz, Naperville; William J. Manning, John McKee and A. T. Jones, Warrenville, Henry W. Grote, J. J. Cole, Ira Brown, Elbert H. Gary and George Brown, Wheaton; George W. Wilson, Hinsdale; and J. M. Vallette, Naperville. It is proposed to build a road to connect the following points: Proviso, Center and Western Springs, in Cook County, and to Hinsdale, Lombard, Downer's Grove, Glen Ellyn, Naperville, Wheaton, Bloomingdale, Roselle and West Chicago, in DuPage County, and to Batavia, in Kane County.

Lexington, W. Va.—It is reported that Messrs. John R. Williams and A. Royal, of Richmond, are interested in a project to build an electric railroad in Lexington.

Middletown, Conn.—At a joint meeting in Middletown, Jan. 29, of the directors of the Middletown Street Railway Company and of the Portland Street Railway Company it was voted to consolidate the two corporations, with $135,000 capital stock, representing $75,000 stock now outstanding of the Middletown company, and $60,000 outstanding stock of the Portland company. J. M. Douglass, of Middletown, was elected President of the consolidated company, and Israel Kelsey, of West Haven, Vice-President. The new company will in the spring begin extending its present line from Gildersleeve's Landing to Glastenbury, where it will connect with the line from Hartford and East Hartford, making on the east side of the Connecticut River a parallel between Hartford and Middletown, competing with the Valley Division of the N. Y., N. H. & H.

Newark, N. J.—The South Orange Railway Co. has secured a franchise to build additional track on McWharton, Van Buren and Adams streets to connect with the Ferry and Market street lines. This company expects to be able to build up all that part of the Fifth, Tenth and Twelfth wards lying south of the Market street electric line and east of New Jersey Railroad avenue.

New Haven, Conn.—The New Haven Street Railway Co., it is stated, has let contracts for an extension of the road from Centreville to Mt. Carmel.

New Rochelle, N. Y.—The Huguenot Electric Railway Co., previously reported has applied for franchises in New Rochelle, Pelham Manor, Larchmont Manor, Mamaroneck, Harrison and White Plains.

New York.—The Fort George & Eleventh Avenue Railroad Co. was incorporated Jan. 31, capital stock $10,000, to build a road, to be operated by a motive power other than steam, 1,500 ft. long, on Eleventh Avenue, between Kings Bridge Road and 175th Street. Among the incorporators are John T. Little, Jr., Robert S. Johnstone C. A. La Rue, F. C. Garrick, Thomas Hanlon, Jr., and H. J. Turner, of New York City; Clement M. Cummings, of Yonkers, and J. H. Browne, of Mt. Vernon.

Oswego, N. Y.—The Lake Ontario & Riverside Railway Co. has applied to the Council for permission to lay double tracks on East Bridge street.

Parkersburg, W. Va.—At a meeting of the Parkersburg Light & Power Co. negotiations were closed for the consolidation of that company with the Parkersburg City & Suburban Railway Co., and for the immediate building of an electric street railroad which the latter company has projected, and for which surveys have been completed and right of way secured. It is expected to have the road completed by July 1.

Sandusky, O.—The Sandusky, Norwalk & Toledo Electric Railway Company, which will run from Sandusky to Norwalk via North Monroeville, from Norwalk to Toledo, has been incorporated, with a capital of $1,000,000. The incorporators are: Clark Rude, W. W. Graham, A. J. Stoll, Henry B. Fowler and W. E. Guerin, Jr.

Somerville, N. J.—The Philadelphia Traction Co. has obtained a franchise from the Town Commissioners of Somerville to build its road through the town.

Toledo, O.—The Toledo & Ottawa Beach Railway Co. has been incorporated, capital stock, $100,000. Among the incorporators are Charles T. Lewis, James H. Doyle, A. L. Spitzer, C. M. Spitzer and Joseph King Duffy, of Toledo. Franklin B. DeFrece, lawyer, 22 William street, New York, is also mentioned in connection with the enterprise.

Trenton, N. J.—The Trenton Passenger Railway Co., is making surveys for the proposed extension of its line to Hamilton Square, a village nearly six miles from the center of the city.

Wilkesbarre, Pa.—Surveyors have been busy for a few weeks past staking out a line for a proposed electric railroad between Wilkesbarre and Hazleton. This is a project which has been talked of for a few years past, and, it is understood, is a plan mutually entertained by the Lehigh Traction Co., of Hazleton, and the Wilkesbarre & Wyoming Valley Traction Co., Wilkesbarre.

GENERAL RAILROAD NEWS.

Railroad Earnings.

[Showing the gross and net earnings for the periods ending at the dates named.]

November 30:		1897.	1896.	Inc. or Dec.
Missouri, Kansas & Texas.				
1 month	Gross	$1,414,305		
1 "	Net	584,914		
December 31:				
Alabama Great Southern.				
6 months	Gross	$905,458	$859,046	I. $46,412
6 "	Net	354,102	337,859	I. 16,253
Allegheny Valley.				
1 month	Gross	$228,187	$199,326	I. $28,861
1 "	Net	92,735	72,973	I. 19,762
12 months	Gross	2,553,134	2,341,613	I. 211,521
12 "	Net	1,074,868	832,509	I. 242,359
Atchison, Topeka & Santa Fe.				
1 month	Gross	$3,609,109	$3,107,619	I. $501,490
1 "	Net	1,114,380	892,950	I. 221,430
6 months	Gross	20,425,761	17,652,639	I. 2,873,122
6 "	Net	6,227,389	5,265,645	I. 961,744
Buffalo, Rochester & Pittsburgh.				
3 months	Gross	$953,607	$889,583	I. $64,021
3 "	Net	347,797	296,293	I. 51,504
Canadian Pacific.				
1 month	Gross	$2,322,742	$1,925,871	I. $396,871
1 "	Net	1,053,454	924,432	I. 129,022
6 months	Gros	25,049,533	20,681,534	I. 4,367,999
6 "	Net	10,303,775	8,107,582	I. 2,196,193
Central of Georgia.				
1 month	Gross	$579,455	$555,727	I. $23,728
1 "	Net	245,739	265,550	D. 19,811
6 months	Gross	3,043,015	2,900,158	I. 142,857
6 "	Net	1,199,130	1,126,489	I. 72,641
Chicago, Burlington & Quincy.				
1 month	Gross	$3,476,516	$2,955,052	I. $521,494
1 "	Net	1,386,173	1,350,845	I. 35,328
6 months	Gross	22,918,410	18,584,338	I. 4,361,072
6 "	Net	9,635,919	8,043,575	I. 1,612,344
Chicago, Milwaukee & St. Paul.				
1 month	Gross	$2,817,081	$2,570,877	I. $246,203
1 "	Net	1,254,514	1,241,008	I. 13,506
6 months	Gross	18,430,280	16,738,282	I. 1,691,997
6 "	Net	7,533,086	6,784,876	I. 748,210
Cleveland, Canton & Southern.				
6 months	Gross	$356,014	$376,652	D. $20,638
6 "	Net	87,734	70,863	I. 16,871
Cleveland, Cincinnati, Chicago & St. Louis.				
1 month	Gross	$1,325,019	$1,204,449	I. $120,570
1 "	Net	314,383	343,608	I. 29,225
6 months	Gross	7,420,841	6,689,423	I. 731,418
6 "	Net	1,697,385	1,678,138	I. 19,247
Delaware & Hudson Canal Co.				
12 months	Gross	$18,360,051	$18,516,443	D. $186,392
12 "	Net	5,274,389	4,852,643	I. 421,746
Delaware, Lackawanna & Western.				
12 months	Gross	$43,975,399	$44,206,351	D. $230,952
12 "	Net	7,316,539	6,730,978	I. 585,561
Erie.				
1 month	Gross	$2,793,255	$2,535,611	I. $257,684
1 "	Net	605,797	505,177	I. 100,620
6 "	Gross	18,240,929	16,600,921	I. 1,640,038
6 "	Net	5,115,664	4,785,806	I. 329,858
Georgia & Alabama.				
1 month	Gross	$120,196	$86,538	I. $33,658
1 "	Net	42,682	24,830	I. 17,852
6 months	Gross	632,937	525,193	I. 107,744
6 "	Net	213,123	179,807	I. 33,316
Iowa Central.				
6 months	Gross	$976,703	$814,681	I. $162,022
6 "	Net	344,227	251,383	I. 92,844
Lehigh Valley.				
1 month	Gross	$1,539,113	$1,551,339	D. $12,226
1 "	Net	464,082	356,924	I. 107,158
Long Island.				
Company:				
1 month	Gross	$291,329	$243,795	I. $47,534
1 "	Net	52,209	26,432	I. 25,777
6 months	Gross	2,495,651	2,272,993	I. 222,658
6 "	Net	918,531	857,520	I. 61,011
System:				
1 month	Gross	$300,794	$251,036	I. $49,758
1 "	Net	48,563	17,849	I. 30,714
6 months	Gross	2,746,973	2,534,831	I. 212,142
6 "	Net	1,031,914	950,401	I. 81,513
Louisville & Nashville.				
1 month	Gross	$1,975,277	$1,854,971	I. $70,300
1 "	Net	706,424	671,956	I. 34,468
6 months	Gross	11,073,814	10,592,917	I. 480,894
6 "	Net	3,810,386	3,531,253	I. 279,133
New York, Ontario & Western.				
1 month	Gross	$312,742	$278,715	I. $34,027
1 "	Net	225,566	206,174	I. 19,392
6 months	Gross	2,182,581	2,126,705	I. 56,876
6 "	Net	1,481,106	1,130,188	I. 50,918
Norfolk & Western.				
1 month	Gross	$979,024	$984,020	D. $4,996
1 "	Net	346,070	314,726	I. 31,344
6 months	Gross	5,772,156	5,417,622	I. 354,534
6 "	Net	1,884,286	1,265,337	I. 618,949
Northern Pacific.				
1 month	Gross	$1,770,663	$1,455,145	I. $315,518
1 "	Net	882,698	575,525	I. 307,173
Oregon Railroad & Navigation.				
1 month	Gross	$555,835	$400,089	I. $155,746
1 "	Net	236,799	175,079	I. 61,720
6 months	Gross	3,642,378	2,709,015	I. 933,363
6 "	Net	1,795,733	1,270,959	I. 524,774
Pennsylvania.				
1 month	Gross	$5,617,804	$5 192,304	I. $425,500
1 "	Net	1,664,297	1,638,197	I. 26,100
12 months	Gross	64,223,176	62,096,576	I. 2,126,600
12 "	Net	20,532,068	18,203,768	I. 2,328,300
Pennsylvania Company.				
1 month	Gross			I. $894,700
1 "	Net			I. 150,800
12 months	Gross	$44,571,728	$42 520,228	I. 2,051,500
12 "	Net	15,122,632	12,957,632	I. 2,165 000
Philadelphia, Reading & New England.				
6 months	Gross	$376,979	$359,616	I. $17,362
6 "	Net	135,932	100,575	I. 35,357
Pittsburgh & Erie.				
12 months	Gross	$4,666,686	$4,501,420	I. $165,265
12 "	Net	1,441,993	1,384,081	I. 57,913
St. Louis & San Francisco.				
1 month	Gross	$543,713	$495,470	I. $48,242
1 "	Net	211,340	193,685	I. 17,654
6 months	Gross	3,609,747	3,120,936	I. 488,811
6 "	Net	1,610,694	1,411,394	I. 198,300
San Antonio & Aransas Pass.				
6 months	Gross	$1,148,657	$1,302,203	D. $153,546
6 "	Net	405,182	541,196	D. 136,014
South Carolina & Georgia.				
6 months	Gross	$695,903	$592,677	I. $103,226
6 "	Net	278,690	234,130	I. 44,560
Southern Pacific.				
1 month	Gross	$4,811,910	$4,324,259	I. $487,681
1 "	Net	1,915,813	1,587,773	I. 328,000
6 months	Gross	28,470,123	26,452,271	I. 2,017,852
6 "	Net	12,014,935	10,440,122	I. 1,574,813
Wabash.				
1 month	Gross	$1,055,906	$965,374	I. $90,532
1 "	Net	300,070	291,680	I. 8,390
6 months	Gross	6,813,473	6,134,058	I. 679,415
6 "	Net	2,233,410	1,900,739	I. 332,671

Baltimore & Ohio.—The earnings for October, according to the Receiver's report filed with the United States Circuit Court, Jan. 24, show total earnings of $3 693,729 and disbursements of $2,917,893, leaving a balance of $775,836.

Brooklyn Elevated.—In the suit by the Reorganization Committee, begun Jan. 4, to foreclose mortgages amounting to $1,250,000 through the Central Trust Company of New York, as Trustees, a judgment was obtained for $1,312,380, which, on Jan. 26, was placed in the hands of the Sheriff. This is a necessary step in the sale of the road. The committee, of which L. P. Olcott is Chairman, calls for the first installment of the assessment on bonds to be paid on or before Feb. 7.

Chattanooga, Rome & Southern.—A petition has been filed in the Superior Court of Lloyd County, Ga., for the foreclosure of a $150,000 mortgage made by the Rome & Carrollton, a part of the Chattanooga, Rome & Columbus, now the Chattanooga, Rome & Southern. As stated in this column Jan. 21, William Strauss, 30 Broad street, New York, represents the holders of these bonds.

Chicago Great Western.—At the annual meeting of the stockholders, Jan. 12, a resolution was passed authorizing the increase of debenture stock from $15,000,000 to $30,000,000.

Columbia & Western.—According to report the Canadian Pacific has acquired control of this narrow gage line, recently completed from Robson to Rossland, B. C., 48 miles. The road was chartered in 1896 as successor to the Trail Creek Terminal Company.

Corvallis & Eastern.—The Oregon Central & Eastern, extending from Yakima, Ore., east to Idaho, 141.8 miles, has been transferred to the Corvallis & Eastern, its successor. The new company proposes to extend the road to Snake River in Malheur Co. The incorporation was made in Oregon in December. (See these columns for Dec 24.)

Cumberland & Ohio.—Circuit Judge Carroll, at Shelbyville, Ky., Jan. 25, confirmed the sale, made on Dec. 13 last, of the Northern Division of this road to the Southern Railroad. (See this column for Dec. 17.) This division extends from Shelbyville, Ky., southwest 26.7 miles to Bloomfield and has been operated by the Louisville & Nashville.

Denver & Rio Grande.—Arrangements have been completed with Kuhn, Loeb & Co. and Speyer & Co., of New York, for refunding $6 382,582 7 per cent. first mortgage bonds maturing Nov. 1, 1900, by an equal amount of 4½ per cent. bonds. This will reduce the interest charges by about $160,000 per annum.

Duluth, Missabe & Northern.—Sixty-four first consolidated mortgage bonds of Jan. 1, 1893, have been drawn for redemption in accordance with the requirements of the mortgage, and interest will cease after Jan. 16. (See this column for Jan. 14.)

Fitchburg.—The Massachusetts Railroad Commission has approved of the issuing of $1,450,000 of 30-year 4 per cent. bonds for refunding old mortgages, referred to in this column last week, and the bonds have been sold to Lee, Higginson & Co. at a price said to be 107 per cent.

Hutchinson & Southern.—The reorganized company will take charge of this property by Feb. 1, and will issue securities as follows: Stock at $20,000 per mile, $2,800,000; first mortgage gold 5 per cent. bonds, at $500,000 per mile, $520,000. As stated in this column two weeks ago, the road was sold at receiver's sale at Hutchinson, Kan., Jan. 14, to the Reorganization Committee at the upset price of $100,000. It is operated from Hutchinson, Kan., to Medford, I. T., 104 miles, and 40 miles in addition are under construction.

Memphis & Charleston.—This road is being advertised for foreclosure sale by L. B. McFarland, Special Master, on Feb 26, at Memphis, Tenn. By the terms of the sale the bidder must deposit $50,000 in cash or certified check, or $100,000 par value of bonds secured by the consolidated mortgage of Aug 20, 1877. The upset price is $2,500,000. As stated in this column last week, the stockholders of the Southern hold a meeting at Richmond, Va., Feb. 18, to authorize the purchase of this road by the Southern. The Memphis & Charleston extends from Memphis, Tenn., to Stevenson, Ala., 272 miles, with a branch of 14 miles from Moscow to Summerville, and another branch from Tuscillia to Florence, Ala. Foreclosure proceedings were begun in July, 1896, and a decree was issued on Feb. 11, 1897, for the sale of the road.

Morristown & Cumberland Gap.—This road has has been advertised to be sold Feb. 19. At the previous sale, held at Morristown, Tenn., Dec. 27, no bids were received at the upset price of $80,000. (See this column for Jan. 7.) No upset price is named for this fourth sale.

Rock Island & Pacific.—The refunding plan, upon which vote will be taken in Chicago, Feb. 15, provides for the issue of $100,000 of new general mortgage 90 year 4 per cent. gold bonds to be issued to retire $40,702,000 of 5 per cent. first mortgage extension and collateral bonds; $4,500,000 of 7 per cent. Chicago & Southwestern Railway Co. first mortgage bonds, due Nov. 1, 1899. The new mortgage provides that none of the existing bonds shall be extended at maturity, so that therefrom the new bonds will be secured by first mortgage on all the railroad property of the company. The new bonds are to be used for acquiring new property and for improvements or extensions. The proposed plan will reduce the interest from $3,321,525 per year to $2,824,904, making an annual saving of $496,621. Speyer & Co., of New York, announce that they will extend $25,000,000 of these new bonds for the old bonds at 103½ with accrued interest. This involves a cash payment to the bondholder of $18.33 on the first mortgage extension and collateral bonds, and $13.33 on the debenture bonds, the date of the settlement being May 1, 1898. The Central Trust Company of New York receives deposits of these bonds and issues its receipts for the same to be exchanged later for other bonds.

Seattle & International.—The Northern Pacific Railroad Company has purchased a controlling interest in the mortgage representing the $5,558,000 bonds of the Seattle, Lake Shore & Eastern, now the Seattle & International. Under the reorganization plan, holders of 60 per cent. of these certificates have the right to sell, lease or consolidate the road. The Northern Pacific has purchased more than the 60 per cent. and offers to take the rest at 80 per cent. of their par value. The new company took possession of the property on July 1, 1896. The road extends from Seattle, Wash., to Sunas, 125.3 miles, with a branch from Woodenville Junction to Sallal, 38.6 miles, and three other branches aggregating 11.45 miles.

Pennsylvania Company.—This company announces that until March 1 it will purchase on a three per cent. basis, the $2,600.000 of St. Louis, Vandalia & Terre Haute second mortgage seven per cent. bonds maturing May 1, and the $2,109,000 Erie & Pittsburgh consolidated mortgage seven per cent. bonds maturing July 1, at the office of the company at Philadelphia, Pa.

Western New York & Pennsylvania.—The reported purchase of the Buffalo, St. Mary's & Southwestern with other properties, referred to in this column for Jan. 21, is officially declared by the Western New York & Pennsylvania to be untrue.

Electric Railroad News.

Appleton, Wis.—Press reports state that the Chicago & Northwestern has secured an option on the line of the Appleton Electric Street Railway Co.

New York, N. Y.—Cars have commenced running on the upper section of the Ninth Avenue Line of the Metropolitan Street Railway Co. This extension of the conduit electric road is now in operation from Sixty-fifth street through the Boulevard to Seventy-second street, thence through Amsterdam avenue to 125th street. It is expected that all the cars of the Metropolitan Company running north of Fifty-ninth street will be operated either by cable or electricity before April 1.

Philadelphia, Pa.—The action commenced by the Attorney-General to recover from the Philadelphia & Radnor Passenger Railway Co., of Philadelphia, a penalty of $5,000 for neglect to file the annual report, has been discontinued. The company has filed an affidavit that the proposed enterprise has been abandoned and has surrendered its charter.

The stockholders of the Hestonville, Mantua & Fairmount Passenger Railway Co., at a special meeting held Jan. 27, voted to approve the proposed lease of this road by the Union Traction Co. The total vote in favor of the lease was 47,043 shares, and 420 shares were voted against it.

Rensselaer, N. Y.—At a recent meeting the directors of the Greenbush & Nassau Electric Railroad appointed President Barnes, Vice-President James and Treasurer Cantwell to confer with the contracting company of J. M. Sullivan & Co., to see what action they propose to take in regard to completing the road. According to the contract the road should have been completed by Feb. 1 and the work is not one-half finished. An election of officers of the company will take place Feb. 22.

Shelton, Conn.—The Supreme Court of Connecticut has disallowed the appeal of the New Haven Railroad Company from Judge Wheeler's decision permitting the construction of the Shelton Street Railway.

TRAFFIC.

Traffic Notes.

The Delaware, Lackawanna & Western has made reductions in party and family tickets between stations within 60 miles of New York.

The American Association of General Passenger & Ticket Agents will hold a special meeting in Washington, D. C., Feb. 14, to consider the proposed anti-scalper law and the proposed agreement for printing all interline tickets on safety paper.

The presidents of the railroads west and southwest of St. Louis held a meeting in New York last week, lasting three days, to consider freight rates. No official report of the proceedings has been given out, but it is said that the differences, which have kept rates below the normal tariffs for many weeks, were satisfactorily settled.

The shipments of lumber out of Williamsport, Pa., in the calendar year 1897 by the Philadelphia & Erie amounted to 6,349 carloads and by the Philadelphia & Reading to 5,439 carloads. The total shipments are slightly less than in 1896. The logging operations this winter indicate that the lumber traffic at Williamsport during the coming year will be very active.

The agreement of the roads in the Western Passenger Association not to carry passengers on freight trains (except trains regularly scheduled for that purpose) appears to have been very much relaxed. The Commissioner of the Kansas City Transportation Bureau has issued a circular giving the numbers of from 10 to 30 trains on all the roads in that vicinity on which passengers will be carried. The Chicago, Milwaukee & St. Paul has not enlarged its list of passenger-carrying freight trains, but, it is said, will continue to issue special permits to commercial travelers as heretofore; but these will not be good on live stock or refrigerator trains.

The roads carrying bituminous coal from the Ohio mines have again formed a rate agreement and it went into effect on Feb. 1. Like numerous former agreements between these roads, it is said to be very strong and sure to keep rates steady and remunerative, but no evidence is given out that it will be any better than its predecessors. The mining interests have established a joint selling agency, which is called the Central Coal & Coke Co. This organization will have headquarters at Columbus.

The convention of operators and miners, held in Chicago last week, agreed upon an advance of 10 cents a ton in the wages of miners, beginning on April 1 next. This agreement covers the Western Pennsylvania, the Hocking Valley and the Indiana bituminous districts.

At the last meeting of the Central Passenger Association Mr. Fisher, of the Columbus, Hocking Valley & Toledo, offered the following resolution, which was laid over until the next meeting, that

Whereas, It is believed that the practice of running Sunday excursions is repugnant to a large number of the better class of people; that it seriously affects the regular week day business as well as entailing a hardship on the employees engaged in such traffic, be it

Resolved, That it is the sense of this Association that beginning with Feb. 1, 1898, and continuing during the calendar year, the lines members of this Association agree not to advertise, run or participate in any excursion on Sundays at rates less than quoted in our regular and party fare tariffs for regular trains, and that we will use our influence in the same direction with lines in our territory not members of this Association.

Grain Rates to Milwaukee and Minneapolis.

The Interstate Commerce Commission, in an opinion by Chairman Knapp, has announced its decision of the case of the Milwaukee Chamber of Commerce against the Chicago, Milwaukee & St. Paul and others.

The Commission rules that distances by shortest available routes are the proper distances upon which to base comparison of differentials in grain rates from the same points of shipment to such markets as Milwaukee and Minneapolis.

Another point decided is that although carriers serving but one of the two competing cities may, by reducing rates to the city served by them, prevent the correction of an unjust relation of rates to the two places from common points of supply, it is nevertheless the duty of the Commission to condemn such a relation of charges, and to indicate the basis upon which the rates should be readjusted.

Milwaukee complained that the rates on wheat and other kinds of grain from shipping points in Iowa, Minnesota and South Dakota to Milwaukee were unlawful in comparison with the rates charged on like grain to Minneapolis. It also claimed that the carriers wrongfully charged higher rates on wheat than on flour from some of the shipping points. The Commission decides that in many instances, and in varying degrees at different points, the differentials in grain rates to Milwaukee above the rates in force to Minneapolis from shipping points on and south of the Southern Minnesota Division of the Chicago, Milwaukee & St. Paul Railway give undue preference to Minneapolis and subject Milwaukee to unreasonable prejudice and disadvantage. That just and reasonable differentials in such rates would be obtained by applying the interstate distance tariff of the Chicago, Milwaukee & St. Paul, or the Chicago & Northwestern to the short line mileage from the several points of shipment to Minneapolis and Milwaukee, and just and reasonable rates to Milwaukee would be made by adding differentials so obtained to rates from time to time in force to Minneapolis. In other words, if the rates to Minneapolis are reduced below the regular distance tariff, those to Milwaukee ought to be reduced by the same amount. Any higher rates to Milwaukee would be relatively unreasonable and unjust to that city. The Commission further decides that any higher rate on wheat than on flour between the same points and on the same line is unjust discrimination and unlawful.

The Traffic Bureau.*

The objects of a traffic bureau are to protect the shippers' interests in all matters of rates, fares, classifications, time cards and other transportation questions. To see that the transportation needs of the city are properly presented to railroad associations, traffic officials and railroad commissions. To act as mediator between the railroads and the public where unreasonable demands are made, or where conditions are such that it is beyond the power of the railroads to correct. To keep up a community of interests between the carriers and shippers that they may work in harmony so far as possible.

To advise members upon questions at issue between themselves and the carriers whether in the nature of claims or otherwise. In such cases it is the duty of the Commissioner to treat all such questions as confidential between himself and parties interested. In cases of conflicting interests between its members, the question to be decided before action should be the greatest good to the greatest number, and action taken which will best serve the community as a whole. It should be as prompt to defend a carrier when in the right as to prosecute when in the wrong.

It should aid carriers in preventing unnecessary or doubtful legislation antagonistic to their interests, and should resist the enactment of laws which would place the public at the mercy of the carriers. Proposed laws are not always what they seem.

By no means the least important function is to keep members promptly advised of traffic conditions, important changes in rates, etc., whether from its own or rival cities, that they may meet the conditions and avoid unnecessary sacrifice of prices in consequence of rumored conditions at other markets.

A traffic bureau should not attempt to handle individual questions with individual railroads. It should not attempt to secure secret rates, special rates or special concessions. It should not attempt to handle questions of minor importance.

If the support of a traffic bureau is dependent upon its ability to show at the end of the year that it has secured certain reductions in rates, etc., or if a member expects every year to see a personal profit directly received for his proportion of the maintenance, all will frequently be disappointed. The fact that the bureau exists and is constantly on the alert to prevent discrimination against the city, prevents such discriminations from being attempted.

It is the duty of the Commissioner of a traffic bureau to keep informed on all traffic and transportation matters in the territory tributary to the city he represents. His knowledge of the necessities of the members is as dependent upon those members as upon himself. . . . Shippers are not always right, nor are railroads always wrong.

Chicago Traffic Matters.

CHICAGO, Feb. 2, 1898.

Western lines are greatly stirred up over the discovery that one of the big packers is exporting provisions from this city by way of Kansas City and Port Arthur at a saving of from 7 to 10 cents per 100 lbs. under the rates via New York, Philadelphia and Baltimore. The goods went by the Chicago Great Western and the Kansas City, Pittsburgh & Gulf roads. The steamship Donmeitzer, which sailed from Port Arthur Jan. 29, carried 5,000 tons of packinghouse products, fully one-half of which came from Chicago. It also had as part of its cago large quantities of flour, meal, cotton and spelter. The steamship is bound for Liverpool, and is the first of the Port Arthur transatlantic steamers to sail. Regular fortnightly trips are advertised. To make shipments via New York possible the rate on provisions and packinghouse products would have to be put down to 22½ cents or less. If this is not done the Chicago packinghouses will be left in the lurch and Kansas City will get the business, as 33½ cents can be saved by shipping from that point direct to Europe via Port Arthur.

Western lines have agreed to a restoration of normal commissions on tickets to all North Pacific Coast points.

The roads from the Northwest to Chicago have put in a new 7½-cent proportional rate on flour from St. Paul and Minneapolis on shipments destined to points east of the Illinois and Indiana state line.

The lines in the Western Joint Traffic Bureau have agreed that hereafter shippers must stand the expense of re-icing cars. East of the Missouri River the roads will furnish the ice at 20 cents per 100 lbs. and west of the river the charge will be 25 cents.

Roads in the Western Passenger Association have agreed to maintain passenger rates to the Pacific Coast on Klondike business at full tariff, but the Canadian Pacific has as yet refused to become a party to the agreement, and the indications are that a fierce war will result over these rates as soon as the business begins to move in any volume. In this city the competition to secure the traffic is already severe.

Board of Trade shippers are making a strong fight to get the Eastern trunk lines to lower the export grain rate from this city to the seaboard. They want the same rate on wheat as on corn, 17½ cents, but although several meetings have been held, the railroad agents have so far stood out against any reduction, refusing even to recommend one.

The Chicago Freight Bureau is just now on the ragged edge. The Board of Trade, which for several years back has paid part of its running expenses, has withdrawn its patronage, claiming that the bureau fails to protect the interests of shippers.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending Jan. 27 amounted to 91,445 tons, as compared with 100,361 tons the preceding week. This statement includes 44,851 tons of grain, 8,256 tons of flour and 12,562 tons of provisions but not live stock. The following is the statement in detail for the two weeks:

Roads.	Week Ending Jan. 27.		Week Ending Jan. 20.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio	5 969	6.5	8,976	8 9
C., C., C. & St. Louis	5,619	6 2	4,111	4 1
Erie	11,093	12.1	11.178	11.1
Grand Trunk	8,574	9.4	12,772	12 7
L. S. & M. S	12,533	13.7	15.443	15.4
Michigan Central	13,023	14 3	12,412	12 4
N. Y., Chi. & St. L	9,323	10.2	9 053	9.0
Pitts., Cin., Chi. & St. Louis	8,959	9.8	10.920	10 9
Pitts., Ft. Wayne & Chicago	11,994	13.1	12,837	12.8
Wabash	4,328	4.7	2,659	2 7
Totals	91,445	100.0	100,361	100.0

* From a paper read before the Business Men's League, St Louis, Mo., Jan. 25, by H. J. Vanlandingham Commissioner of the St. Louis Traffic Bureau.